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REPORTS

FROM THE

CONSULS OF THE UNITED STATES.

No. 144.—SEPTEMBER, 1892.

Cotton in Egypt

Louis B. Grant,

ISSUED FROM THE BUREAU OF STATISTICS, DEPARTMENT OF STATE.
ALL REQUESTS FOR THESE REPORTS SHOULD BE AD-
DRESSED TO THE SECRETARY OF STATE.



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Mr. Rogers replied that as a matter of fact such was not the case. True, house rent was higher there, but the necessities of life to workingmen and their families were very cheap. The best class of clothing was also more expensive, but that for workingmen was not. The weather was exceedingly hot during his visit, and one of the first things Mr. Rogers did was to purchase a cool, thin suit, which cost him 52s., which he didn't think he could get as cheap in this country. Then, as to the heat, those who went to America got so accustomed to it that they didn't mind it more than they would here. One day while he was there the temperature was 105° in the shade; the next day it was 103°, while another day it was 96°, so that on the whole it was quite pleasant. Upon being asked whether the belief generally entertained here was correct, viz, that the weather at times became so extremely hot that men engaged in steel, iron, and tin works were obliged to relinquish work for more or less prolonged periods, Mr. Rogers replied that these men worked as steadily there during the hot weather as they did here. Referring to the cost of living, Mr. Rogers instanced the case of a Llanelly tin-plate worker, for whom he had found employment, who told him that not only was he in a position to live comfortably upon the wages he earned about 36s. a week, but he was able to send about half of it to his family at home.

Conversation then ensued upon the condition of trade in South Wales, Mr. Rogers declaring that it was really worse now than it was twelve months ago, which was proved by the number of works which were either partially or wholly idle. He could not account for it, and feared that a bad period had set in, while he could see no prospect of a change.

Mr. Rogers was then asked whether he had read the recent utterances of Mr. D. Randall, M. P., who declared that the action of Messrs. Morewood & Co. in erecting works in the United States before waiting to see the results of the November elections was not only "selfish and suicidal," but also "ill-timed, misjudged, and unpatriotic." Mr. Rogers smiled in reply, and added that his attention had been called to the honorable member's speech.

"The unpatriotic people," proceeded Mr. Rogers, "are those who set class against class and labor against capital, and it is those whom the working classes ought to blame for the depression which is settling down upon our manufactures. Fifteen months ago, when interviewed by a reporter, I said as follows:

"All such methods of propping up wages rates as limiting the make to so many boxes in a given time will have to be thrown to the wind, and all will have to do their best to make the greatest use of the appliances and materials at their disposal. If the men will not make the best and most economical use of their arms we shall be compelled to displace them by machinery, or move our works to other countries, where materials and labor and tariffs will enable us to carry on our business profitably."

"My warning and advice have not been heeded, and I am not, under those circumstances, to blame that the results which I predicted have been fulfilled."

"Well," interposed the interviewer, "would you mind telling me what induced the firm to erect such works in America?"

"Our action is by no means entirely due to the McKinley bill. I know perfectly well that the day must come when the duty will be reduced in America, and I don't think that the majority of the voters, who are workingmen, are so shortsighted as to think it would be to their benefit that the duties should be at present reduced. To erect works now, trusting to the high duty imposed by the McKinley bill, would be very unwise."

"How can you reconcile this statement with your action?"

"What really carried weight with us in our decision to erect works in America was the doctrines and actions of the leaders of the workingmen. They cry out against capital, denounce it as an evil to the country, and say they must crush it. We capitalists on our part say: 'Very well; if you don't like to have us in the country, and you, who are the majority of the voters, wish to have such laws as will injure and hamper us in the conduct of our manufactures, we will go to other countries where the value of capital is appreciated by all classes, and every inducement held out to us to erect works and to invest our capital.' Many of our politicians coquette with labor and other questions, instead of, as true friends should,

pointing out to the working classes the folly of the course they pursue. I don't so much blame the genuine workingman leader, but, owing to want of knowledge and experience, he takes too local and narrow a view of trade questions, and acts and advises as if Great Britain were the whole world. She is only a very small part of the manufacturing world, and has not now the advantages she used to have; rather the contrary."

"Have you commenced erecting your works near New York?"

"Oh, yes; but we do not anticipate starting operations until October."

"Supposing the present tariff is maintained, will the fact of its being so affect South Wales and the Cwmbwrla works?"

"We don't anticipate stopping our works here whatever happens; at any rate, so far as our steel works and mills are concerned. The best evidence of that is that we are putting up in them more modern and perfect machinery. We intend making a hard fight to keep our works here and at Cwmbwrla running. Our American works are what is called in sporting terms a 'hedge,' so that if the actions of the leaders of the working people and the houses of Parliament make it unprofitable for us to carry on our works in this country, we shall still be able to be large manufacturers. If the presidential election had been a month ago, and if Mr. Cleveland had been elected, it would make no difference whatever to what I say."

Referring to the remark made before a public audience that it was "unpatriotic" on the part of the firm to erect works instead of waiting until November, Mr. Rogers observed that the November elections, however they might go, would have no effect upon what they were doing. As he had said before, the McKinley tariff was only a secondary cause for their action. "Capital," he added, "is sensitive and timid, and will always flow to the countries which offer most security and the freest opportunities for untrammelled development, and where capital is most abundant there will be the greatest prosperity, most regular employment, and most happiness."

Proceeding, Mr. Rogers remarked that some of the Democrats said: "We are quite prepared to admit that if the duties are reduced wages will have to be correspondingly reduced, but our aim is that wages shall be so far reduced that our manufacturers can undersell Europe in neutral markets, such as India, Australia, etc.; but we believe that the cost of living and of luxuries should also be so reduced that workmen would be as well off at the lower wages as they are now at the higher wages."

"Are there any other works in course of erection in America now?"

"Yes, there are several. When President Harrison was chosen, Mr. McKinley gave figures showing that there were twenty-five tin-plate works either built or in course of erection, the accuracy of which I can not confirm, as I only visited a few. The manufacture of tin plates is, however, very rapidly taking root in the United States, and some very magnificent plants have been erected. In one works which I visited was the finest plant which I have ever seen. An enormous steel and tin plate concern is being built in Chicago."

"Does this plant dispense with any of the manual labor necessary here?"

The interview closed with the remark that it did, and to a very great extent.

COTTON IN EGYPT.*

REPORT BY ACTING CONSUL-GENERAL GRANT, OF CAIRO.†

It appears that cotton was known to the ancient Egyptians. In ancient times it grew here in a wild state. Herodotus mentions a plant which bore flowers of a pinkish color and a fibrous fruit. It is thought that the seed

*Samples of Egyptian cotton which accompanied this report have been transmitted to the Department of Agriculture.

†I have obtained most of the information contained in this report from the General Produce Association of Alexandria, the president of which very kindly responded to my inquiries.—L. B. G.

came from the far East, as the plants gave a woolly product of short and weak staple. It was only in the early part of the present century that the cultivation of cotton began to extend and exotic seed to be imported. Mako and Jumel were the names given to the new product, which was of a white color and of long staple. Mako was the name of a large landed proprietor who especially lent himself to the culture of the new cotton. Jumel was the name of a French agriculturist who first imported seed from America. In France Egyptian cotton is still called Jumel.

As an article of export cotton dates from the year 1821, but during thirty-five years the quantity varied only from 150,000 to 500,000 cantars (cwts. of 98 pounds). A great stimulus was given to this culture by the Viceroy Mehemet Ali. It is said that he planted all the seed he could get on his own land with successful results, and, being stimulated by the high price obtained for the new fiber in the European markets, he encouraged its cultivation throughout Lower Egypt, the soil and climate of which were found to be admirably adapted to its growth.

It was in 1837-'38 that this culture really began to take serious proportions. Abbas Pasha I still further encouraged it. In 1860 the export duty was reduced from 10 per cent to 1 per cent ad valorem, which, of course, helped to stimulate the culture; but the great impetus was given by the American civil war, the high prices at that period causing the cultivation to be pushed to the utmost limits.

Up to our days the Mako-Jumel has experienced many changes and evolutions, which are attributed to the nature of the soil. The color gradually became a yellowish brown, and took the name of Ashmouni, from the village of Ashmoun, where this change was first noted.

VARIETIES.

The present varieties of Egyptian cotton as known to commerce are the following: Ashmouni, Mit-Affi, Abiad, Bamieh, and Gallini.

Ashmouni.—For many years this quality formed the bulk of the Egyptian crop, but it is now almost entirely superseded by Mit-Affi. In color it was of a lightish brown, lighter than the Mit-Affi, and with a staple rather over 1 inch in length. It is still cultivated in some parts of Lower Egypt, notably in the neighborhood of Mehala-el-Kebir, but the acreage of this quality is decreasing every year. In Upper Egypt, however, it is more extensively cultivated, as the nature of the soil there is less favorable to the Mit-Affi cotton.

Mit-Affi.—The seed of this cotton was discovered by a Greek merchant living in the village of Mit-Affi, where he first planted it and whence it derives its name. The seed has a bluish-green tuft at the extremity, which first attracted his attention. On planting this seed he found that it possessed many advantages over the Ashmouni. It matured earlier and was therefore much less susceptible to damage from the salt fogs, which are very often prevalent in September. Its chief superiority, however, consisted in the

greater proportion of lint yielded to the seed. At first the cantar of 315 rotols (pounds) yielded about 112 rotols of lint, and sometimes even more; but now it has deteriorated and rarely gives so much, generally averaging 106 to 108 rotols. Ashmouni rarely attains 98 rotols. The finder kept the secret for some years, but it ultimately became known. The Mit-Affi is of a darker and richer brown than the Ashmouni. It is of excessive strength, but, except in some districts, the staple is not longer than that of Ashmouni. The districts where it has longer staple are about Cafr Zayat, Chibin-el-Koom, and notably Birket-es-Sab.

Abiad.—Abiad, as its name indicates, is white cotton, and is chiefly grown at Zifta, Mit-Gamr, and, to a smaller extent, at Birket-es-Sab. In other districts it is only grown sporadically, and even in the districts above mentioned it is rapidly giving way to Mit-Affi. The staple is much longer than that of American cotton, the bulk reaching about 1 inch in length, while some fine lots are to be found having a length of $1\frac{1}{4}$ and even $1\frac{1}{2}$ inches. The yield is 105 to 112 rotols.

Bamieh.—This quality is yearly degenerating. The form of the tree is quite different from the other varieties of cotton, being tall and not bushy. It is supposed to have been produced by accidental hybridization of the Ashmouni cotton tree and the Bamieh plant, as it resembles the latter in several points. Its chief characteristics are great length, fineness, and silkiness of staple and a rather lighter color than Ashmouni, but generally a greater weakness of staple. The tree, however, is more delicate than the other varieties, and is therefore very susceptible to September fogs. It yields about 100 to 105 rotols of lint per cantar of 315 rotols. The chief districts now producing the best quality of this variety are: First, Mansoorah; second, Semenood; and then Mehala-el-Kebir.

Gallini.—This variety has almost entirely disappeared from cultivation, as the quality had deteriorated to such an extent that it became most difficult to sell. Only one small lot of 122 cantars appeared in the Alexandria market this year, and, I am informed, is still unsold. It has been said that this variety was originally produced from imported Sea Island seed, but I am informed by competent authority that this is an error. It was first found accidentally at a place called Galleen, in the province of Garbieh, about the year 1863 on land belonging to Haidar Pasha, and from there it spread all over that province. Attempts at cultivation in other districts were not successful, which proved that its proper development depended entirely on the quality of the soil. Though very fine, silky, and strong, it differed greatly from Sea Island, being of a brown color instead of white. Many attempts have been made to introduce the culture of Sea Island cotton in Egypt by importing seed from the United States, but all experiments failed. Although the cotton produced was very long and fine, it was so weak in staple that all spinners condemned it.

Other varieties.—New varieties are continually springing up. Just now a variety called Hamouli is coming into the market. This is strong and of

a good mellow brown color, but not so long in staple as Mit-Affi. Here again the chief incentive to its culture is the good yield of lint. So far, however, the amount cultivated is extremely small. Another variety called Zeplyri is also spoken of, but nothing is yet known of this, as only a few cantars were known to exist last year. There is also another variety, of which very little is known yet, because the possessors of the seed keep the matter secret. This resembles Sea Island much more than Gallini, having all the requisite characteristics and the same white color.

PLANTING AND CULTIVATION.

Planting takes place in March and April. In this connection I can not do better than quote McCoan. He says, in "Egypt as It Is" (p. 189):

The cultivation of the plant, of whichever variety, differs slightly according as the ground sown is *batiek*, i. e., watered solely by annual inundation, or *miscoveh*, which is not thus fully irrigated, but requires to be artificially watered several times before and after seed-sowing. In Lower Egypt, where the land is fatter and stronger than above Cairo, one plowing generally suffices before seed time, but in the upper valley two at least are necessary; deep if the soil be light, but shallower where it is heavy. Small patches of ground are hoed where the cultivator can not afford the cattle power required for the plow. The ground being next leveled with the hoe or a rude kind of harrow, furrows are made about 2 feet apart, in which, at intervals of some 3 feet, holes are drilled 3 or 4 inches deep. Into each of these the sower drops half a dozen seeds, which he covers in with earth and waters (or not), and the operation is complete. The *batiek* lands are thus sown in March and the *miscoveh* in April. Near the towns vegetables are generally planted between the furrows, to make the most of the ground; where this is not done the plants are thinned and earthed up by plowing between the ridges.

The cotton fields are artificially watered about eight times during cultivation, generally by bringing the Nile water between the ridges on which the plants are growing, thus saturating the soil completely. The general ripening of the pods begins in September (but the Mit-Affi ripens about a month earlier), and the cotton is ready for the first picking in October. A second picking takes place in November or at the beginning of December and a third in January and February.

The wages of pickers are: For men, from 20 to 30 cents per diem; for children, about 15 cents per diem.

After the last picking the cotton trees are generally pulled up and used for fuel. In some few instances they are only cut down close to the ground, and a second crop is produced from the same plants. This second crop, however, is not as good as the first, and it is becoming a universal custom to use fresh seed for every crop. In the interval between the last picking and the new sowing the cotton fields are sown with "berseem," or Egyptian clover, which grows quickly and can be removed in time for the next cotton planting. Continuous growing of cotton on the same lands impoverishes the soil, and the quality of the product deteriorates year by year. For this reason it is customary to follow a kind of rotation system. For example, cotton is rarely grown on the same lands for more than two years in succession, and in most cases for not more than one year. The second or third

year, as the case may be, these lands are devoted to cereals or some crop which does not injure the soil and which aids it to recover its good qualities. By some growers rice is considered the best crop to grow in the interval. During its cultivation the soil regains its strength, on account of its continual submersion.

The best producing lands are those which are left two years under light crops and planted with cotton only every third year.

AREA.

The total area planted with cotton during the season 1890-'91 was 855,479 acres, and during the season 1891-'92 it was 831,241 acres. This area will probably be increased in proportion as more lands are brought under irrigation. As the means of irrigation are being improved year by year, it is probable that in time there will be a considerable increase in the production of cotton, as it is one of the best-paying crops. It is thought that next season's crop will be still larger than that of last year, although it is impossible to give any idea of the exact increase of area.

PRICES.

During the last cotton season prices have been very low. It will be observed by a glance at the following table that only on four previous occasions have the prices of Egyptian cotton been so depressed, viz, in the years 1843, 1845, 1848, and 1851.

Table showing the exportation and average price of cotton from 1821 to 1892.

Year	Average price per cantar.*	Exports.
		<i>Cantars.†</i>
1821.....	\$16.00	908
1822.....	15.50	35,108
1823.....	15.50	159,426
1824.....	17.00	228,078
1825.....	13.00	218,312
1826.....	13.00	216,181
1827.....	13.00	159,642
1828.....	13.00	59,255
1829.....	12.00	104,920
1830.....	12.00	213,585
1831.....	10.50	186,675
1832.....	15.00	136,127
1833.....	25.00	56,067
1834.....	30.75	143,892
1835.....	25.25	213,604
1836.....	18.50	243,230
1837.....	13.00	315,470
1838.....	15.00	238,833
1839.....	18.25	134,097
1840.....	13.00	159,301
1841.....	13.25	193,507
1842.....	10.00	211,030
1843.....	7.75	261,064

* Reduced from piasters tarif; 1 piaster tarif = 5 cents.

† 1 cantar = 98 pounds.

COTTON IN EGYPT.

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Table showing the exportation and average price of cotton from 1821 to 1892—Continued.

Year.	Average price per cantar.	Exports.
		<i>Cantars.</i>
1844.....	\$18.00	153,363
1845.....	6.00	344,955
1846.....	10.25	202,040
1847.....	10.00	257,492
1848.....	7.25	119,965
1849.....	10.00	257,510
1850.....	11.75	364,816
1851.....	8.75	384,439
1852.....	10.25	670,129
1853.....	10.00	477,390
1854.....	9.00	477,905
1855.....	9.25	520,886
1856.....	10.75	539,885
1857.....	16.25	490,960
1858.....	12.75	519,537
1859.....	12.00	502,645
1860.....	12.25	501,415
1861.....	14.00	596,200
1862.....	23.00	721,052
1863.....	36.25	1,181,888
1864.....	45.00	1,718,791
1865.....	31.75	2,001,169
1866.....	35.25	1,288,762
1867.....	22.50	1,260,946
1868.....	19.00	1,253,455
1869.....	23.00	1,289,714
1870.....	19.50	1,351,797
1871.....	15.75	1,966,215
1872.....	21.00	2,108,500
1873.....	18.55	2,013,433
1874.....	16.15	2,575,648
1875.....	14.95	2,206,443
1876.....	18.85	3,007,719
1877.....	13.70	2,439,157
1878.....	12.25	2,583,610
1879.....	13.60	1,680,595
1880.....	24.05	3,123,515
1881.....	14.35	2,792,184
1882.....	13.75	2,846,237
1883.....	15.00	2,293,537
1884.....	13.50	2,686,382
1885.....	12.55	2,591,486
1886.....	11.00	2,904,842
1887.....	12.00	3,025,965
1888.....	13.75	3,593,327
1889.....	16.00	2,648,640
1890.....	13.40	3,496,108
1891.....	11.50	4,159,405
1892.....	8.75	4,750,000

I am informed by the Alexandria General Produce Association that this fall in prices is entirely attributable to the enormous crop in America. I must add, however, that the last Egyptian crop was the largest ever produced, reaching 4,750,000 cantars. Therefore, the low prices can be attributed to the general overproduction of the world.

The cost of production on large farms in Egypt is about \$9.74 to \$12.17 per acre, exclusive of the land tax, which varies from \$1 to \$7.41 per acre. The small Arab cultivator, who works with his family on his 3 or 4 feddans, can produce cotton much cheaper. The average production of lint per acre is about 340 pounds, but good lands will yield as much as 700 pounds.

Owing to the absence of any regular statistics it is difficult to say exactly what is the cost of land in Egypt. There is no sort of relation between the value of land and its taxation. I am informed that the highest rate common for cotton lands in Lower Egypt is \$7.50 to \$8 per acre. With that tax good lands sell for \$100, \$150, and, in rare cases, even for \$200, but on many inferior lands this tax is so crushing that they are almost unsalable.

GINNING, PRESSING, ETC.

The cotton gins used in Egypt are Platt's patent roller gins. The total number of ginning mills throughout Upper and Lower Egypt is about one hundred. They are distributed in all the chief cotton centers. Large towns like Mansoorah, Zagazig, Cafr Zayat, Tantah, and Mehala-el-Kebir have from ten to twenty mills each. There are hydraulic presses attached to nearly all the mills, so that the cotton comes from the mills to Alexandria in hydraulic-pressed bales. Only about four of the interior mills have steam presses. With the exception of the bales sent from these four mills all the cotton is steam pressed in Alexandria before exportation. From two or three places cotton is still sent to Alexandria in bags of about $2\frac{1}{2}$ cantars each, but the bale system is increasing every year.

During the busiest season, say during October, November, December, and January, most of the larger mills work night and day. In this case there are two relays of employes who work twelve hours each, turn and turn about. When business slackens the working hours are from fifteen to sixteen per day, beginning at 6 a. m. and ending at 9 p. m. But in these cases only one set of hands is employed, whose daily wages are reckoned at the rate of one and one-third days to the day of fifteen to sixteen hours. Wages vary a good deal, according to the district, namely, from 10 to 25 cents per diem for ordinary hands. As the season comes gradually to a close the mills work very irregularly.

GENERAL REMARKS.

The large cotton merchants are nearly all resident in Alexandria. They send their agents among the villages to purchase the cotton from the various growers. It is then sent to the nearest mills, where it is ginned and pressed in hydraulic bales, after which it is transported by rail or boat to Alexandria. Here it is pressed in steam presses into bales weighing from 750 to 780 pounds, and measuring about 20 cubic feet. It is then ready for exportation.

It will be noticed that America is not mentioned among the other countries in the table of exportation. This is because almost all the cotton ex-

ported from Egypt to America is shipped via England, especially Liverpool, where it is transshipped. The figures in the table of exportation to the United States are taken from the invoice books of the consulate-general at Cairo and the consular agency at Alexandria, where all invoices of merchandise shipped from Egypt to the United States are certified. They may therefore be considered accurate. There are doubtless some purchases of Egyptian cotton made in England for the American market; but such shipments would figure in the exports from England.

The cotton shipped to the United States is used for mixing and for making thread.

LOCAL CONSUMPTION.

The only consumption of cotton in Egypt is for stuffing pillows and mattresses. This need not be taken into account for statistical purposes, as it is chiefly cotton waste.

EXPORTATION.

The following table shows the exportations to various countries during the years 1884 to 1889:

Table showing the quantity and value of cotton exported from Egypt to various countries from 1884 to 1889.

Countries.	1884.		1885.		1886.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Cantars.</i>		<i>Cantars.</i>		<i>Cantars.</i>	
England.....	2,029,077	\$27,679,995	1,847,581	\$22,150,830	1,869,292	\$22,123,890
Russia.....	242,797	3,248,540	518,245	6,279,650	450,171	5,198,140
France and Algeria.....	293,384	3,600,135	250,657	3,052,135	266,150	3,130,655
Austria-Hungary.....	222,808	2,987,295	247,411	3,049,965	245,245	2,796,895
Italy.....	201,723	2,692,660	206,876	2,690,325	163,403	1,882,505
Spain.....	63,055	840,945	88,106	1,039,285	29,988	359,845
Other.....	20,796	139,175	30,145	219,815	16,551	112,130
Total.....	3,073,570	41,188,745	3,188,821	38,531,995	3,040,803	35,604,060

Countries.	1887.		1888.		1889.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Cantars.</i>		<i>Cantars.</i>		<i>Cantars.</i>	
England.....	1,956,306	\$24,162,815	1,619,444	\$20,665,000	2,000,430	\$26,763,545
Russia.....	371,723	4,614,870	375,983	4,744,095	314,353	4,207,845
France and Algeria.....	234,668	2,888,015	208,314	2,636,650	248,795	3,312,200
Austria-Hungary.....	232,862	2,899,625	253,064	3,173,990	355,446	4,751,080
Italy.....	216,130	2,555,635	181,495	2,315,415	231,328	3,114,090
Spain.....	20,792	262,925	28,043	367,990	20,139	266,415
Other.....	34,532	328,950	25,492	213,415	35,711	323,385
Total.....	3,067,013	37,712,835	2,691,835	34,116,555	3,206,202	42,738,580

The following table shows the value of exportations of cotton from Egypt to the United States during the nine years ended 1891:

Year.	Value.	Year.	Value.
1883.....	\$3,781	1889.....	\$580,631
1884.....	25,604	1890.....	728,052
1885.....	47,719	1891.....	2,417,168
1886.....	9,816	Total.....	4,117,079
1887.....	112,577		
1888.....	191,731		

There were no exports of cotton to the United States during the years 1881 and 1882.

For the quarter ended March 31, 1892, the exports to the United States amounted to \$523,725.43.

Table showing the quantity and value of cotton seed exported from Egypt to various countries from 1884 to 1889.

Countries.	1884.		1885.		1886.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>	
England.....	9,481,950	\$6,352,730	10,407,518	\$6,575,085	11,641,333	\$5,928,175
France and Algeria.....	1,430,487	967,535	926,222	571,200	918,946	480,465
Other	319	240	77,374	49,670	1,689	1,075
Total.....	10,913,116	7,320,505	11,411,114	7,195,955	12,561,968	6,409,715

Countries.	1887.		1888.		1889.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Bushels.</i>		<i>Bushels.</i>		<i>Bushels.</i>	
England.....	11,505,786	\$5,834,815	10,503,444	\$6,008,680	10,825,843	\$6,815,980
France and Algeria.....	1,015,432	513,260	907,769	538,520	702,157	444,455
Other	71,753	37,175	2,503	1,515	14,239	9,025
Total.....	12,592,971	6,385,250	11,413,716	6,548,715	11,542,239	7,269,460

LOUIS B. GRANT,
Acting Consul-General.

UNITED STATES AGENCY AND CONSULATE-GENERAL,
Cairo, May 21, 1892.

2649

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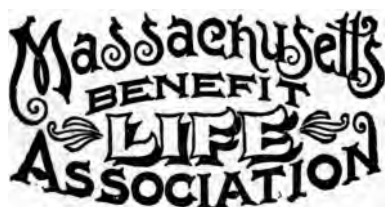
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Vol. CCV.

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HOME TO THEE.

HOME — but not to thee, sweet,
As so oft before,
Home — but home to thee, sweet,
Never, nevermore.

Laggard grow the feet, sweet,
Dragging wearily,
That stepped once so fleet, sweet,
Home to Love and thee.

Thou'rt not there to greet, sweet,
Nor to welcome me,
I no more shall meet, sweet,
Home and Heav'n in thee.

Home ! without thy smile, sweet ?
Home ! without thy kiss ?
Home ! without thy heart, sweet ?
Home ! and *that* to miss ?

Home ! no, not to me, sweet,
Till there can be this —
Daylight without sun, sweet,
Heaven without bliss.

Yet — thou art at home, sweet,
Waiting still for me,
While I homeless roam, sweet, —
Home eternally.

And my steps may be, sweet,
Evermore may be,
Home, still home to thee, sweet,
Home to God and thee !

Cornhill Magazine.

A FAREWELL.

[E. S. PIGOTT, FEBRUARY 23RD, 1895.]

FRIEND, farewell, the word is true and
sweet,

Although I say it not with any thought
Of parting long or severance complete.

Farewell, and yet farewell ! may there be
nought

To hinder thy safe passage o'er the line
Invisible that parts the lingering way
Which still is ours from that which now is
thine.

Be here the darkness left ; meet thou th'
encountering day.

Light be thy foot that has grown slow of
late.

And free thy breath, unstayed by fog or
chill,

Thy shoulders lightened of each mortal
weight,

No prick of whin-strewn moor or thorny
hill ;

Hosen and shoon thou gav'st with liberal
hands,
Kind words and gentle judgment ever
thine ;
Now take thy way, content, o'er flowery
lands,
And meet, benignant thou, the eternal
smile benign.

I far advanced upon the self-same road,
My heart forestalling still the footsteps
slow,
Waiting the opening of those gates of God,
Sick of believing, sick to see and know,
No word of parting say, no tear will shed,
But speed with tender greeting and with
praise
The guest that to a fairer hostel led,
Goes from our winter forth, content, by
happier ways.

Till next we meet ! and if meanwhile ere I
Make up to you, you meet with those of
mine

Of whom we talked 'neath this same
wintry sky

The other day ; oh friend, a friendly sign,
A kind word give, as 'twas thy habit here,
Ever forestalling question with reply,
As "All is well, eh ?" lending to the ear
A token kind of home, to be remem-
bered by.

Then pass thou on, all cheerful to thy
place,
Thou whom no whisper of the envious
crowd

E'er moved to evil word, suspicion base,
Or echo of ill rumor, low or loud.

The age is almost past was thine and mine,
The saner days and better near their end,
How glad would I my lingering past resign,
And faring forth like thee, recover many
a friend ?

Spectator.

M. O. W. O.

NATURE'S MAGIC.

GIVE her the wreckage of strife —
Tumulus, tumbled tower,
Each clod and each stone she'll make her
own
With the grass and innocent flower.

Give her the Candlemas snow,
Smiling she'd take the gift,
And out of the flake a snowdrop make,
And a lambkin out of the drift.
Good Words. VIDA BRISS.

lingered at their tryst a minute behind the hour.

At the stab to her pride that the discovery gave, the blind dropped from her hand. The next instant she had plucked it aside, as if to scourge her mature sense with the sight of her raw humors. "So that is the end of that," she thought, as she watched the white sail mount to the opposite shore. She would never marry Broomielaws; that had been settled for her. Whether she ever could have married him was beyond consideration now; yet it seemed to her that it was as likely she should have married him as that she should marry this laddie, who was even now landing on the other side of the Forth. She was a girl when the boy came to her that morning, with the first touch of spring, the harbinger of her womanhood. The boy had sailed away from a woman, years older than himself in knowledge, and ripe in the consciousness of what the world held in store for her. No; she would never marry Teddy.

And, indeed, he did not ask her again.

D. STORRAR MELDRUM.

From Nature.

THE NILE.¹

I AM to speak to you to-night of the Nile, and I think I may fairly say it is the most famous river in all the world; famous through all the ages, for the civilization that has existed on its banks; famous for its mystic, fabulous rise, about which so many sages and philosophers have pondered; famous for its length, traversing one-fifth the distance from pole to pole; famous, and apparently destined to be famous, for the political combinations that ever centre around it. But I feel I must begin by an apology, for now that Egypt has come so completely within the tourist's range, probably many of my hearers have seen more of the Nile than I have.

¹ A lecture delivered at the Royal Institution, on January 25, by Sir Colin Scott-Moncrieff.

If a foreigner were to lecture to his countrymen about the river Thames, and were to begin by informing them that he had never been above Greenwich, he might be looked upon as an impostor; and perhaps I am not much better, for I have never been higher up the river than Philæ, six hundred and ten miles above Cairo. For information regarding anything higher up, I must go, like you, to the works of Speke, Baker, Stanley, and our other great explorers. I shall not, then, detain you to-night with any elaborate account of this upper portion of the river, but will only remind you briefly of that great inland sea, the Victoria Nyanza, in extent only a little less than the American Lake Superior, traversed by the equator, and fed by many rivers, some of them taking their rise as far as 5° S. lat. These rivers form the true source of the Nile, the mystery only solved in the present generation.

The outlet of this great lake is on its north shore, where the river rushes over the Ripon Falls, estimated by Speke at only four hundred or five hundred feet wide, and with a drop of twelve feet. Thence the river's course is in a north-west direction for two hundred and seventy miles, to where it thunders over the Murchison Falls, a cliff of one hundred and twenty feet high. Soon after that it joins the northern end of Baker's Lake, the Albert Nyanza, but only to leave it again, and to pursue its course through a great marshy land for more than six hundred miles, to where the Bahr Gazelle joins it from the west; a little further down the great Saubat tributary comes in on the east. This is the region in which the river is obstructed by islands of floating vegetation, which, if checked in their course, at last block up its whole width, and form solid obstructions known as *sadd*s, substantial enough to be used as bridges, and obstacles, of course, to navigation, until they are cleared away. The waters of the Saubat are of very light color, and tinge the whole river, which, above its junction, is green and unwholesome,

from the long chain of marshes which it traverses. Hence it is called the White Nile. Six hundred miles further brings us to Khartoum, where the Blue Nile from the Abyssinian mountains joins it, and at two hundred miles still further to the north it is joined by the Atbara River, also from Abyssinia, a torrent rather than a river.

Baker gives a graphic account of how he was encamped by the dry bed of the Atbara on June 22, 1861. The heat was intense, the country was parched with drought. During the night the cry went forth that the floods were coming, and in the morning he found himself on the banks of a river, he says, five hundred yards wide and from fifteen to twenty feet deep. All nature had sprung into life. A little north of the junction of the Atbara is Berber, whence you will remember is the short cut to Suakin in the Red Sea, which so many thought would have been the true route for our army to take in relieving Gordon. From Khartoum to Assouan is a distance of eleven hundred miles of river, during which it makes two immense curves, for on a straight line the distance is not half so much, and it is in this part of its course that it passes over the six great cataracts or rapids which block all ordinary navigation. The first or furthest north cataract is just above Assouan, a distance of seven hundred and fifty miles from the Mediterranean, through the country known as Egypt. From the junction of the Atbara to its mouth in the Mediterranean, a distance of sixteen hundred and eighty miles, the Nile receives no tributary. On the contrary, during every mile of its course its waters are diminished by evaporation, by absorption, and by irrigation. The river gets less and less as it flows through this rainless land, and its maximum volume is to be found during the floods at the junction of the Atbara, and at other seasons at Khartoum, eighteen hundred and seventy-five miles from the Mediterranean.

The whole distance by river from the Victoria Nyanza to the sea is about thirty-five hundred miles. It may not

be easy to derive any clear impression from this bare recital of mileage. Let me try to convey to you in some other ways the idea of the length of the Nile. Standing on the bridge at Cairo, I used to reflect that I was just about half-way between the source of the Nile and the White Sea. Or to put it another way: if we could suppose a river crossing our English Channel, and that the Thames should find its outlet in the Euphrates and the Persian Gulf, that river would be about as long as the Nile.

In this short sketch of the course of the Nile, I must not forget to mention one interesting feature. About forty miles south of Cairo, the low Libyan chain of hills which bounds the Nile valley on the west is broken by a gap, through which the waters of the river can flow, and beyond this gap lies a saucer-shaped depression called the Fayûm, of about four hundred square miles in area, sloping down to a lake of considerable size, the surface of whose waters stands about one hundred and thirty feet below that of the sea. This lake is known as the Birket el Kurûn.

From the time of the earliest Egyptian records, this province of the Fayûm was famed for its fertility, and to the Egyptian taste for its delightful climate. Many of the most precious monuments of antiquity have been found in the Fayûm. The famous Labyrinth is supposed to have stood just at its entrance; and what has excited most interest for the engineer in all times, it is here that Herodotus places that wonderful Lake Mœris, which receiving for half the year the surplus supply of the Nile, rendered it back again in irrigation to Lower Egypt during the other half. Where this lake actually was, has excited discussion since any attention has been paid to ancient Egyptian history. It seems pretty clear that in earlier days the Birket el Kurûn was of much greater proportions than it is now, but how it ever could have been large enough to allow of its waters flowing back into the Nile valley when the river was low, without at the same

time drowning the whole Fayûm, is not very clear.

Now, what are the functions of a great river, what are the offices which it renders to man? And first of all, at least in this latitude, we would mention the carrying off to the ocean of the surplus water that descends from the skies. Nobly does the Nile fulfil this duty; but with this enormous qualification, that it transports the water from tracts where there is too much, and carries it all free of cost, not to waste it in the sea, but to bestow it on tracts, where it is of priceless value, more than taking the place of rain in watering the fields.

The next function of a river is to form a highway through the land, and for most of its course the Nile fulfils this duty well too. Gordon considered it possible for steamers to ascend the Nile during the floods from its mouth to the Fola rapids, a distance of about three thousand and forty miles; but at other seasons, the six cataracts cannot be passed. Leaving out the eleven hundred miles which they occupy, there is an unbroken seven hundred and fifty miles in the lower, and nearly twelve hundred miles in the upper river. I cannot look on it as probable that it will ever pay to make navigable canals and locks round these cataracts, as it would entail so much hard rock-cutting.

Another function of a river is to promote industry by the employment of its water-power. We know how valuable is this power even in England, and how much more in countries like Switzerland, where it abounds, and on the great rivers of America. Excepting a few very rude wooden wheels in the Fayûm, I do not know, through all the annals of the past, of a single water-wheel ever turned by the power of the Nile. But that power exists to an almost unlimited extent. And may we not prophesy that some day in the future, when that long stretch of Nubian cataracts has fallen into civilized hands, and when we know how to transmit electric energy with economy, that then our descendants will draw wealth

to Egypt from its chain of barren cataracts?

As a drainage outlet to a continent, as a long highway, as a source of power, the Nile is great; but not so much so as many other rivers. Its unique position is due to the benefit it confers on Egypt in turning it from being a desert into being the richest of agricultural lands, supporting with ease a population of about six hundred to the square mile. Herodotus truly said Egypt is the gift of the Nile. It more than supplies the absence of rain, and this it does, first, by the extraordinary regularity with which it rises and falls; and secondly, by the fertilizing matter which the waters carry in suspension, and bestow upon the land. Imagine what it would be to the English farmer if he knew exactly when it would rain and when it would be sunshine. When the Irrigation Department of Egypt is properly administered, the Egyptian farmer possesses this certainty, and he has this further advantage—that it is not merely water that is poured over his lands, but, during nearly half the year, water charged with the finest manure.

According to the early legend, the rise of the Nile is due to the tears shed by Isis over the tomb of Osiris, and the texts on the Pyramids allude to the night every year on which these tear-drops fall. The worship of Isis and Osiris has long passed away, but to this day every native of Egypt knows the *Lailat en Nuktah*, the night in which a miraculous drop falls into the river, and causes it to rise. It is the night of June 17. Herodotus makes no allusion to this legend of Osiris. In his time, he says, the Greeks gave three reasons for the river's rise. He believed in none of them, but considered, as the most ridiculous of all, that which ascribed the floods to the melting of snows, as if there could possibly be snows in such a hot region. It was many centuries after Herodotus's time when the snowy mountains of central Africa were discovered.

The heavy rains commence in the basin of the White Nile during April,

and first slowly drive down upon Egypt the green, stagnant waters of that marshy region. These appear at Cairo about June 15. About a fortnight later the real flood begins, for the rains have set in in Abyssinia by May 15, and the Blue Nile brings down from the mountains its supply of the richest muddy water. It is something of the color and nearly of the consistency of chocolate, and the rise is very rapid, as much sometimes as three feet per diem, for the Atbara torrent having saturated its great sandy bed, is now in full flood also. The maximum flood is reached at Assouan about September 1, and it would reach Cairo some four days later, were it not that during August and September the water is being diverted on to the land, and the whole Nile valley becomes a great lake. For this reason the maximum arrives at Cairo about the beginning of October. The rains cease in Abyssinia about the middle of September, and the floods of the Blue Nile and Atbara rapidly decrease; but in the mean time the great lakes and marshes are replenished in the upper regions, and slowly give off their supplies, on which the river subsists, until the following June. Yearly this phenomenon presents itself in Egypt, and with the most marvellous regularity. A late rise is not more than about three weeks later than an early rise. In average years the height of the flood at Assouan is about twenty-five and one-half feet above the minimum supply. If it rises twenty-nine feet above this minimum, it means peril to the whole of Egypt, and the irrigation engineer has a hard time of it for two months. If the river only rises twenty feet above the minimum, it means that whole tracts of the valley will never be submerged. Such a poor flood has happened only once in modern times, in 1877, and the result was more serious than the devastation caused by the most violent excess.

The mean flood discharge at Cairo is about two hundred and eighty thousand cubic feet per second, the maximum about four hundred thousand. The mean lowest Nile is about four-

teen thousand cubic feet per second at Cairo, but some years there is not more than ten thousand cubic feet per second passing Cairo in June, and within three months after this may have increased forty-fold.

Until this century, the irrigation of Egypt only employed the flood waters of the river, and it was this that made it the granary of the world. No doubt, rude machines for raising Nile water were used at all seasons and from all times. But by these it was not possible to irrigate on a large scale, and in reality they were only employed for irrigating vegetables or gardens, or other small patches of land. It must not be thought that the water of the flooded river is ever allowed to flow where it lists over the lands. The general slope of the valley on each side is away from the river, a feature which the Nile shares with all Deltaic streams. Along each edge of the river, and following its course, is an earthen embankment, high enough not to be topped by the highest flood. In Upper Egypt, the valley of which seldom exceeds six miles in width, a series of embankments have been thrown up, abutting on their inner ends against those along the river's edge, and on their outer ends on the ascending sides of the valley. The whole country is thus divided into a series of oblongs, surrounded by embankments on three sides, and by the slope of the desert hills on the fourth. In Lower Egypt, where in ancient days there were several branches of the river, this system was somewhat modified, but was in principle the same. These oblong areas vary in extent from sixty thousand to three thousand or four thousand acres, and the slope being away from the river, it is easy to cut short, deep canals in the banks, which fill as the flood rises, and carry the precious mud-charged water into these great flats, or, as they are termed, basins of irrigation. There the water remains for a month or more, some three or four feet deep, depositing its mud, and then at the end of the flood it may either be run off direct into the reced-

ing river, or, more usually, passed off through sluices from one basin to another, and ultimately back into the river. In November the waters have passed off, and wherever a man and a pair of bullocks can walk over the mud, and scratch its surface with a wooden plough, or even the branch of a tree, wheat or barley is sown, and so saturated is the soil that the grain sprouts and ripens in April or May without a drop of rain or any fresh irrigation. And a fine crop is reaped. One of our great brewers told me the other day, that when barley grown in this country was spread in the malting-house, about three per cent. of it must be counted on as not sprouting and being dead. If grain two or three years old was used, as much as twenty per cent. would be found dead. With Egyptian barley, he said, even after several years, you could count on every grain germinating. The crop once reaped, the fields remain dry, and crack in the fierce summer heat until next flood comes on.

The tourist who only comes to Egypt to shun "winter and foul weather," knows nothing of the majestic glories of the Nile flood. The ancient Nilometer at the south end of the island of Roda, just above Cairo, is one of the most interesting sights of the place. The water enters from the river by a culvert into a well about eighteen feet square, with a graduated stone pillar in the centre. On each side of the well is a recess about six feet wide and three feet deep, surmounted by a pointed arch, over which is carved in relief a Kufic inscription, and a similar inscription is carried all round the well, consisting of verses of the Koran. A staircase goes down the well, from the steps of which the initiated may read the height of the water on the pillar; but they are few in number, and the hereditary sheikh of the Nilometer, whose duty it is to keep the record, is a person of some importance. The Nilometer dates from A.D. 861, and I believe in the archives of Cairo may be found the daily record for one thousand years.

I need hardly tell you that when our English engineers took the river in hand, we established a number of gauges at Wadi Halfa, Assouan, Cairo, and many other points, on more scientific principles than the venerable Nilometer of the Roda Island.

After the river has begun to rise, its height is daily chanted through the Cairo streets until it reaches sixteen cubits on the gauge. At this point the Khalig el Masri, the old canal that flows through the heart of Cairo, is opened — up to this point it is dry, and full or empty it is little more than a sanitary abomination at present; but in former days it occupied an important place, and when the Nile water was high enough to flow down its bed, it was looked on that the flood had fairly set in, and that the kindly fruits of the earth might be duly expected.

The head of this canal is on the right bank of the river, just south of Cairo. The water enters a channel some thirty feet wide, with a high wall on its left, and a sloping bank on its right or southern flank. The water then flows under the pointed arch of an old stone bridge. The bed of the canal is cleared so that it would flow in at a gauge of about fourteen and one-half cubits, but an earthen bank is thrown across it about four feet higher.

There is no more interesting ceremony in Egypt than the annual cutting of the Khalig, as the opening ceremony is called. It takes place between August 5 and 15. Days before preparations are being made for the festival. Tents with innumerable lamps are placed along the wall on the one side. Frames for all manner of fireworks are erected on the sand-bank on the other side. All the notables are there in full uniform, or in canonicals. The khedive himself, or his representative, the Sheikh ul Islam (the highest dignitary of the Muhammedan faith), the Sheikh el Bekri, the Sheikh es Sadât, all the learned scribes of the great university of the Azhâr, the cabinet ministers and under-secretaries, the sirdar of the army and his staff, the judges and the financiers.

The Egyptian troops are turned out, salutes are fired, and about eight o'clock in the warm summer night the classes all assemble under the gaily lighted tents, the masses crowd round the frames for the fireworks, the street is lined with harem carriages full of closely veiled figures, though it is not much that they can see from their broughams. Out in the river, just opposite the canal's mouth, is moored an old hulk of a certain sea-going outline, which has been towed up from Boulak during the day, and is an emblem of the time when the great republic of Venice sent an envoy to witness the ceremony. This boat is full of lamps, and fireworks too. As the night deepens the excitement increases. The populace on the bridge and the opposite bank are shouting, yelling, and dancing wildly round the fireworks. On the other side are the gay uniforms and lighted tents, from whence we can look over the wall down on the dark water, where you see brown figures plunging in and waist-deep digging with their hoes at the embankment that blocks the canal's mouth.

Long before midnight the fireworks have gone out, and left the splendid stars to themselves; the grandees have all gone to bed, but the people keep up the revelry, and in the morning, by 7.30, every one has come back. Then but little of bank is left uncut; a few more strokes of the big hoes will do it, and the brown skins and the brown water reflect the bright sunlight from above. Then the Sheikh ul Islam solemnly thanks the Almighty, Allah the All-powerful, the All-merciful. He implores his blessing on the flood, and at a signal the bank is cut, the waters rush in, and with them a crowd of swimmers. A bag of silver piastres is scattered among them, and the ceremony is at an end.

There is a pretty legend, worth telling, of the cutting of the Khalig. Amr, the Muhammedan general, took Cairo in A.D. 640. Long before then there had been a heathen ceremony, and a virgin was yearly sacrificed to

the god of the river. When the season came round, Amr was called upon as usual to sacrifice the girl. He sternly refused. That year the Nile flood was a failure. You can fancy how the indignant heathen population must have raged at the invader, and said, "We warned you what would happen if you didn't propitiate the river god." Cannot we fancy, also, how Amr's wild Arab soldiers must have had their faith sorely tried, and how they must have felt puzzled as to whether in this strange new country, with all those demon-built temples and pyramids, obelisks, and sphinxes, it might not be as well to make friends of the local gods. Could Allah really help them here? Again the Nile flood came round. This time surely Amr would sacrifice the girl, and save the land. No; he would not. The people rose in rebellion. Amr stood firm. But he wrote to the Kalif Omar for orders (Omar, whose name you will remember has come down in history as the destroyer of the Alexandrian library). Omar approved of his conduct, but sent him a paper to throw into the Nile. On the paper was written, "From Abd Allah Omar, Prince of the Faithful, to the Nile of Egypt. If thou flow of thine own accord, flow not; but if it be Allah, the one the mighty, who causeth thee to flow, then we implore him to make thee flow." Amr threw the paper into the water, and the Nile rose forthwith exactly as it was wanted. Since that day no girl has been sacrificed; but a pillar of earth is yearly left to be washed away in the middle of the canal, called the bride or the girl.

Such, as I have briefly described it, was the irrigation of Egypt until this century, when it fell under the rule of Muhammed Ali, a very sagacious and strong if a very unscrupulous ruler. He saw that the country could produce far more valuable crops than cereals. The European market could be supplied with these from the fields of Europe, but Europe could not produce cotton and sugarcane. Egypt had the climate, had the soil, had the teeming population; but these crops required

water at all seasons ; nor would it do to flood the fields to any depth, for just at the flood season the cotton crop is ripening. There was plenty of water in the river ; but how was it to be got on to the land ? Perennial irrigation was a fresh departure. As I have said, the Nile rises about twenty-five and one-half feet. A canal then running twelve feet deep in flood has its bed thirteen and one-half feet above the surface of the Low Nile. Either the Nile water had to be raised, or the beds of the canals had to be lowered, in order that one should flow into the other, and after that the water had to be raised from the canal on to the land. Muhammed Ali began by lowering the canal beds of Lower Egypt, an enormous work considering the great number of the canals ; and as they had been laid out on no scientific principles, but merely to suit the fancies of Turkish pashas or village sheikhs, and as those who had to excavate them to this great depth had only the slightest knowledge of levelling, the inevitable result followed — the deep channel became full of mud during the flood, and all the excavation had to be done over again. Incredible as it may seem, this great work was done year after year. It was a great serf population ; if they were not fighting Muhammed Ali's battles in Arabia and Syria, they might as well be digging out the canals. No one thought of paying or feeding the workmen. The bastinado was freely applied if they attempted to run away. If they died under the labor there were plenty more to come. But of course the work was badly done. The water might enter the canal ; but as the bed was not truly levelled, it did not follow that it would flow far. Then, as the river daily fell, the water in the canals fell too, and lessened in volume as the heat increased, and more was required. At last — in June, perhaps — the canal was dry, and the cotton crop that had been sown and watered, weeded and nurtured, since March, was lost altogether.

Then some one advised Muhammed Ali to throw a dam across the river,

and so raise the water, and the result was the great Barrage.

About twelve miles north of Cairo the Nile bifurcates, and finds its way to the sea, by the Rosetta and Damietta branches. Across the heads of these two branches were built two stone bridges, one of seventy-one, the other of sixty-one arches, each five metres or 16·4 feet span. These arches were intended to be fitted with gates ; by lowering which, all the water would be dammed up, and diverted into three great trunk canals, taken out of the river just above these bridges. One to the right or east of the Damietta branch was to supply water to all the provinces of the eastern delta, one between the two bridges was to supply the splendidly fertile central delta, the third to the left or west of the Rosetta branch was to water all the western delta down to Alexandria.

There was no intention of water storage at the Barrage, but it was merely with the object of controlling the supply. While there was water enough in the river, by closing the gates it could be kept to a uniform level, and sent down the three trunk canals, from which it was to branch, into many minor ones. As the river went down, gate after gate would be closed, and so a constant supply could be kept in the canals. The idea was thoroughly sound. The execution was feeble.

Mougel Bey, the French engineer in charge of the work, had no doubt many difficulties to contend with. The work went fitfully on for many years, thousands of men being forced to it one year, and carried off to a campaign the next. But at last it was sufficiently finished to allow of an opening ceremonial in 1861. Gates had been fitted into the Rosetta branch arches, never into the Damietta.

The central canal had been dug in tolerably satisfactory style. The western canal, too, had been dug, but passing through a strip of desert it had become very much filled up with sand. The eastern canal was dug some five miles, and then stopped. Of course

the Barrage without these canals was useless. However, they began to experiment with it, closing the gates on the Rosetta side. It was intended to hold up four and a half metres, or fourteen feet nine inches of water. It never held up five feet, till in 1867, it cracked across from top to bottom, on the western side. An immense cofferdam was built round the cracked portion, and the water was never held up again more than about three and a half feet, while the work was looked on as a deplorable failure. In 1883, all hope of making anything out of the Barrage was abandoned, and the government was on the point of concluding a contract with a company to supply Lower Egypt with irrigation by means of an immense system of steam pumps, to cost £700,000 to begin with, and £250,000 a year afterwards.

That year there was a wretched serf army of eighty-five thousand men working at canal clearances for one hundred and sixty days, unfed, unpaid. The burden was nearly intolerable. The irrigation was all by fits and starts. There was no drainage; every hollow became sour and water-logged. With waterways everywhere, there was no navigation. In Upper Egypt things were better, as the system was a simpler one. But when we came to look into them too, we found great abuse, and on an average about forty thousand acres never succeeded in obtaining water, though in the midst of abundance.

The Fayûm had long been a much-neglected province, though a most picturesque and attractive one. From carelessly allowing Nile water to flow into the lake during the floods, it had risen enough to swamp ten thousand acres of valuable land, and this mischief we found still increasing.

Throughout the whole country drainage had been absolutely neglected. And here I would point out that irrigation without drainage means the sure deterioration of the land sooner or later. Considerable pains had been taken in Egypt to get the water on to the land. No sort of effort had been

made to get it off. In a properly irrigated tract, between every two canals of supply, there should flow a drainage channel; the former should follow as far as possible the highest lands, the latter should follow the lowest. The canal gets smaller, till at last it is exhausted, giving itself out in innumerable branches. The drain, like a river, gets larger as it proceeds, being constantly joined by branches. But if there be no drains, and if the canals are laid out to flow into one another, so as to divide the country into, as it were, a cluster of islands, you can understand how the drainage water has no means of flowing off into the sea, and settles in unwholesome swamps. These we found prevailing to an alarming extent in the rich provinces of the delta. Such was the wretched state of Egyptian agriculture — the one single source of the country's wealth — when Lord Dufferin laid down the lines of the English administration, which have been amplified and pursued ever since.

It was in May, 1883, that I took charge of the Irrigation Department in Egypt, having before then had some twenty years' experience of similar work in India; and I soon had the inestimable advantage of being joined by a band of the most indefatigable, energetic and able engineers, also from India, with whom it was my great privilege and happiness to be associated for the next nine years. I cannot talk too highly of these my colleagues — men who knew their work and did it, who kept constantly moving about in the provinces, badly lodged, badly fed, denied domestic comforts, constantly absent from their wives and families (they were all married men).

My friends, happy is the reformer who finds things so bad that he cannot make a movement without making an improvement. Happy the reformer who has as colleagues a staff of thoroughly loyal, duty-doing and capable men. Happy the reformer who is not pestered on all sides by the officious advice of the ignorant. Happy the reformer who has behind him a strong, brave chief, as honest and truthful as

he is strong. Such rare happiness fell to me in Egypt with my noble colleagues, and with Lord Cromer as our chief.

It is not my intention to enter into any details to-night of what our work was in Egypt. I have lately spoken about that elsewhere, and there would be no time to do so now. I must just describe it generally.

On first arrival, I was pressed, both by English and Frenchmen, to go into the question of the storage of the flood waters of the river on a large scale. I declined to do so, considering it would be time enough to think of increasing the quantity of water at our disposal when we had profitably used all that we already had, and while mighty volumes were daily flowing out to the sea, it could not be said that we were doing that. The first great work to be studied was the Barrage. We were warned on all sides to have nothing to say to it, as it was thoroughly unsound; but we felt sure we must either make it sound or build an entirely new one, and we resolved on the former. The work had failed because it was faulty in design, the floorings and foundations not being sufficiently massive, and faulty in execution from the dishonest use of bad materials and from bad workmanship. The bed of the river consists of nothing more stable than sand, and alluvial mud for at least two hundred feet deep. It was out of the question to think of getting down to solid rock. It was not, as we thought, very safe to excavate very deeply close to the existing works, so we decided not to try it, but merely to strengthen and consolidate the foundations, built as they were on sand. I have said that the work consisted of two great bridges over the two branches of the river. We could not shut up either branch entirely; but we decided to strengthen and complete one-half of each bridge each season, which meant four seasons' work. While the river was still in considerable flood each November, we began to throw out great embankments of earth about two hundred feet

from the bridge; one up-stream, the other down-stream of it, beginning at the shore end, and ultimately enclosing one-half of the river as in a pond. This used to take three months' hard work. Then we pumped the water out of this enclosure, and laid bare the very bed of the river. Then we laid a massive stone flooring, five and a half feet thick, extending one hundred feet up-stream, and as much down-stream, of the bridge. This was very difficult and hard work. It was kept going day and night, without intermission, from March till the end of June. Then we cut great holes in our embankments, cleared out our machinery, and prepared for the arrival of the flood at the beginning of July. Each year one-half of one bridge was finished, and the whole was completed at the end of June, 1890.

In connection with the Barrage were completed the three great canals to carry off all the river supply from above it. So that practically now the Low Nile is emptied every season at the Barrage and diverted into these canals, and no water at all escapes to the sea. The natives wade everywhere across the river north of this point. Since it was completed the Barrage has given no trouble. It holds up every year four metres, or thirteen feet of water. The three trunk canals were all supplied with locks one hundred and sixty feet by twenty-eight feet, and adapted for navigation. The whole of these works cost about £800,000. The annual increase of the cotton crop, compared to what it was before 1884, is never less than two and a half millions sterling, which has not been a bad investment for Egypt.

Turning to Upper Egypt, my colleague, Colonel Ross, directed his attention very closely to the adjustment of canals overlapping one another, passing under and passing over one another; so that in future I trust that with the feeblest Nile flood it will be possible to pour water over every acre of the land.

The question of drainage was very thoroughly taken up. Twelve years

ago it may be said that there were no drainage channels in Egypt. Two years ago there were about one thousand miles of such channels, some with beds as wide as sixty feet and flowing deep enough to carry cargo boats, others with beds only three or four feet wide. I am glad to say by these means large tracts in Lower Egypt which had been abandoned as totally ruined have now been restored to cultivation. The level of the lake in the Fayûm was reduced by thirteen feet between 1885 and 1893, and most of the inundated lands around it have been again dried.

I have already mentioned the cruel hardship of the *corvée*, the serf army of eighty-five thousand men who were employed in the canal clearances from January to July, nearly half the year. I believe this institution was as old as the Pharaohs, and it was not easy to abolish it. But of course it went sorely against our British grain. Little by little we got money to enable us to pay our labor. By an annual outlay of £400,000 this spring *corvée* has entirely ceased since 1889, and now the Egyptian laborer carries out these clearances in as free a manner as his brother in Middlesex, and gets paid for his work.

Having thus, to the best of our powers, utilized the water in the river flowing past us, we turned our attention to the storage of the surplus waters. Without some such storage it is impossible to increase the cultivation during the Low Nile. All the water is used up. During High Nile there is always a great volume escaping useless to the sea.

There are two ways in which the water may be stored: either by throwing a dam right across the river and forming a great lake above it, or, if such a place can be found, by diverting the flood water into some suitable hollow, and drawing it off from there at the season of low supply, as done by Herodotus's celebrated Lake Mœris. At one time there was a hope that such a storage basin might be found. An American gentleman, named Mr. Cope

Whitehouse, in search of the real Mœris, found a very remarkable saucer-shaped depression just south of the Fayûm. We knew it could not have been Mœris, because in its bed we found no traces of a deposit of Nilotic mud, but it might be possible all the same to utilize it. The place was very carefully surveyed, and the project was estimated; but it was found that the cost of conveying the water into this basin would be so great that it was out of the question.

Attention was then turned to the possible sites where a stone dam might be built right across the river. The southern boundary of Egypt just now is near Wady Halfa, the second cataract. It is no use going to look for sites south of this, for the country is in the hands of the Mahdi and his fierce, dervish soldiers. North of this point, unquestionably the best site, perhaps the only possible site is where the Nile valley is traversed by a broad dyke of hard Syenite granite, in passing over which the river forms its first cataract just south of Assouan. It is here divided into several channels between rocky islands, and no channel is deep, so that it would be easy to divert the water from one after another, to lay bare the bed of the river, and lay the foundations of the dam in the open air. It wants no engineer to understand what an advantage this is.

And the great dam, such as was designed by Mr. Willcocks, would have been a work worthy of the land of the Pyramids and Karnak—a great wall of squared granite blocks—eighty-two feet thick at base, of a maximum height of one hundred and fifteen feet, a mile and a quarter long, pierced by sluices large enough to allow of the whole Nile at highest flood rushing through. The lake formed would have been one hundred and twenty miles long. Would this not have been a work of some majesty to commemorate forever the English rule in Egypt—a work one would have been proud to have had a hand in? But it was not to be. The Egyptian saw no objection to it. The money could have been

found. But there was an insuperable obstacle created when, on the Island of Philæ, about 250 B.C., Ptolemy II. built a temple to Isis, on the site of older buildings long disappeared. Round this temple other buildings clustered, built by Greeks and Romans. Those of you who have not seen them, are probably familiar from pictures with the group of venerable buildings standing amidst palm-trees on the rocky island, and reflected in the waters below.

Had Ptolemy only built his temple on the island of Elephantine, a few miles north, it would have been unaffected by the great dam, but Philæ is just to the south, or up-stream side of where the great dam must necessarily have come, and in consequence the island, with its temples, would be drowned for about six months every year. You probably remember the outburst of rage and indignation which the announcement of this proposed desecration created in London last summer. It was not to be tolerated that England should commit such vandalism. In vain it was answered that the place belonged to Egypt, not to England—that the Egyptian, who was to gain so much by the dam, cared absolutely nothing about Ptolemy and his temples—that he was prepared to pay a large price for a great work to benefit his country. What business was it of England to forbid him?

And it was not only the English who were indignant. For once, and only for once, I fear, since we occupied Egypt in 1882, was educated opinion in England and France at one. Both alike insisted that Philæ should not be drowned. Nor must I admit had all the engineers that were interested in the question the full courage of their opinions. While they longed to build the dam, and lamented the perverse fate that had put Philæ there, still they wished to spare Philæ—and their voice has prevailed. The majestic structure has been cut down twenty-seven feet, and now will only be eighty-eight feet high, and Philæ will stand henceforth in a lake, but will never be drowned.

Personally I accept the situation, for I never believed that it would be sacrificed. But yet as an engineer I must sigh over the lost opportunity for England of making such a splendid reservoir. And as a friend to Egypt, I sigh still more that the country will not have such a splendid supply of water as would enable Upper Egypt to have the full benefits now possessed by Lower Egypt, and Lower Egypt to expand and flourish.

The reduced scheme will, however, be a great boon to the country, and I trust will now be put in hand without delay.

In 1884, when the expedition up the Nile was first being considered, I was asked by the general officer commanding in Egypt, whether I thought there was any possibility of the Mahdi diverting the river in the Soudan, and depriving Egypt of its water. The late Sir Samuel Baker was in Cairo at the time, and I consulted him as to whether he knew of any place in the Nile valley where during highest flood the water spills off to the right or left, towards the Red Sea or the Libyan Desert. He said he was sure there was no such place, and I then told the general it would be impossible for the Mahdi to divert the Nile. I was sure that with his savages he would never dam up the low supply until its surface attained the height of flood supply, and if even then during flood there was no spill channel, Egypt was safe enough.

But what the Mahdi could not do, a civilized people could do. A government official has no business to talk politics, and the Royal Institution is no place for politics; but I may be allowed to point out an evident enough fact, that the civilized possessor of the Upper Nile valley holds Egypt in his grasp.

At this moment the Italians are on the eastern edge of that valley—a nation, I must say, who have been consistently most friendly to us in Egypt. Supposing that they occupied Khartoum, the first thing they would naturally and very properly do would be to spread the waters of the Low Nile over

the Soudan; and no nation in Europe understands irrigation so well. And what then would become of Egypt's cotton crops? They could only be secured by a series of the most costly dams over the river, and the fate of Philæ would surely be sealed. But more than this: a civilized nation on the Upper Nile would surely build regulating sluices across the outlet of the Victoria Nyanza, and control that great sea as Manchester controls Thirlmere. This would probably be an easy operation. Once done, the Nile supply would be in their hands; and if poor little Egypt had the bad luck to be at war with this people on the upper waters, they might flood them, or cut off their water supply at their pleasure.

Is it not evident, then, that the Nile from the Victoria Nyanza to the Mediterranean should be under one rule? That time is perhaps far off. I conclude what I have to say to-night, by giving you the assurance, and I challenge contradiction, that at no time in the long history of Egypt under Pharaoh or Ptolemy, Roman or Arab or Turk, have the people of the country been so prosperous, or so justly ruled as during the last nine years.

From The Fortnightly Review.

THE CRISIS IN NEWFOUNDLAND.

It is rarely that a British colony, having once achieved responsible government, contemplates a return to the conditions of a crown colony. Yet, from the latest information to hand, it would appear that such a return is within the range of practical politics in Newfoundland. The first step would be the appointment of a Royal Commission in the island to inquire into the existing and most deplorable state of affairs, and although the government is naturally averse to this, local opinion, now thoroughly on the alert, is largely in favor of it. For some time past the colonists have been face to face with a most serious commercial crisis. The revenue for January is only thirty thousand dollars, being only

one-sixth of the amount received in the corresponding month last year, and a large deficit is feared at the end of the quarter. The secretary of the Colonial and Continental Church Society reports that "every one is depressed beyond description. There is no labor for the poor because there is no money to pay for it. We are organizing relief parties to provide for the prevailing distress." A correspondent also states that the hungry and half-clad crowds are in a miserable condition, and what they need most is warm clothing for the biting month of March. The missionaries themselves are in an evil plight; as one of them pleads earnestly for an overcoat for himself, and clothes for his children. In a climate where the thermometer is often below zero in the winter, such tales of hardship must elicit our warmest sympathy.

Great as were the calamities and privations that followed the great Mauritian hurricane of April 29, 1892, they were, nevertheless, more endurable than those of Newfoundland, for the horrors of famine and starvation are largely mitigated in a warm and tropical climate. The appeal to the charity of our philanthropists is great, and it is to be hoped that it will meet with a ready response. It is not long ago that a most destructive fire (July, 1892) destroyed a large portion of St. John's, the capital of Newfoundland, and the centre of government. But now the colonists are faced with the more permanent and terrible evils of bankruptcy.

It is well known that the prosperity of Newfoundland has always depended upon the successful prosecution of one industry, viz., the fishing industry. Newfoundland cod is considered superior to that caught off the coasts of Scotland, Norway, Iceland, and the Faroes. It is the task of the Newfoundland fishermen to provide fish for Roman Catholic Europeans, for Brazilians, and for the colonists of the West Indies, and the trade has fallen chiefly into the hands of a few capitalists.

REPLIES TO HIS CRITICS.
IN THIS NUMBER.

Eighty-first Year.

Tros Tyrinusque mihi nullo discrimine agetur.

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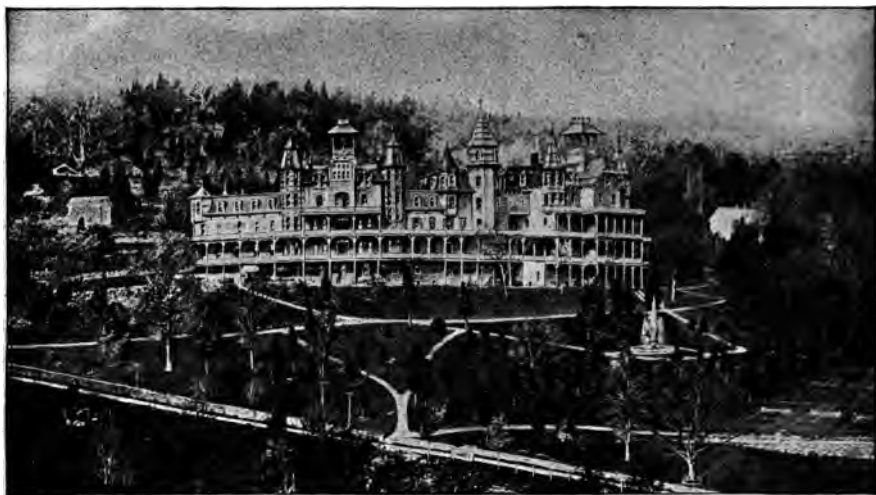
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CONTEMPORARY EGYPT.

BY THE HON. FREDERIC C. PENFIELD, U. S. DIPLOMATIC AGENT
AND CONSUL-GENERAL TO EGYPT.

THE ending of two lives that had run in channels strangely similar redoubles interest over that country ever paramount in anomalous conditions—Egypt. Vocabularies of praise and censure have been well nigh exhausted on Ismail Pasha and De Lesseps, whose recent deaths were chronicled simply as items of news rather than events; but the nineteenth century is indebted to them for a work of incalculable value to the whole world, Egypt alone excepted.

Egypt reaps no benefit from the international waterway crossing its domain, uniting the Orient with the Occident; in fact, the Suez Canal, which has played a mighty political part, made and unmade khedives, and which, by strange fatality, passed from the control of the nation that built it to that of the country that strenuously fought its construction, is responsible for the modern bondage of the Egyptian people.

Prior to the giving of the canal concession, Egypt had no debt. Her credit was first pledged in Europe by Viceroy Said, who, to add lustre to his name, headed the subscriptions to the capital of the enterprise with \$17,000,000, although the undertaking was to cost Egypt nothing, and from which for ninety-nine years she was to receive fifteen per cent. of the gross receipts. This laid the corner-stone of the new house of bondage.

Ismail succeeding to the throne, lent himself readily to the seductive project, learning how easy it was to borrow money by affixing his signature to an innocent-looking paper thoughtfully prepared in Europe. His first transaction was a matter of \$30,000,000, and thenceforth there was frequent exchange between

His Highness and Paris and London of these innocent-looking papers, for gold.

There were many investors in the scheme, but it seemed as if Egypt alone fed the insatiable monster with money. Native workmen digging the ditch, received no pay. It was forced labor. But the French Emperor awarded the French company an enormous sum for Ismail's breach of contract, when he sent the fellaheen back to their fields, such of them as survived fevers and starvation. Egypt paid, of course.

The colossal work completed, Ismail's magnificent extravagance devised a celebration of fitting splendor, from his Oriental standpoint. The opening of the canal in 1869 outranked in gorgeousness anything described in the Arabian Nights. Royalties and notables, from Europe, were treated to a *fête* in Cairo transcending the wildest dreams of Haroun-al-Raschid, lasting a month, over which the Merry Monarch spent \$21,000,000 of the people's money.

History reveals nothing equal to Ismail's carnival of extravagance. In thirteen years he added to Egypt's exterior burden \$430,000,000, and increased the taxation of his subjects more than fifty per cent.

A day of reckoning came, however, when engagements could not be met, for Egypt was hypothecated to its fullest value, and the usurers of Europe made such outcry that Ismail was forced by the Sultan to surrender his throne and go into exile. Forseeing the crash, he had sold to the British Government his own shares for \$20,000,000, on which the Egyptian treasury for twenty years faithfully paid five per cent. interest. This purchase illustrated Disraeli's shrewdness, for by prompt action he prevented the shares from going to France. They are to-day worth more than four times what they cost, and secure to England the voting control. The promised fifteen per cent. of tolls had also been sacrificed by Ismail, as security on which to borrow the last few millions necessary to complete the canal.

The dethroned Khedive's bequest to his country was a debt of \$450,000,000, not two-thirds of which sum ever left the hands of the bankers' agents and negotiators. The principal work over which it was spent was the canal, not to belong to Egypt until 1968. Docks at Alexandria and Suez, and a few hundred miles of railways and telegraphs, costing perhaps ten per cent. of the

sum borrowed, represented the benefits to his nation. Steam vessels of useless pattern, stucco palaces, gilded coaches and operatic scores and costumes, formed meagre assets.

In Tewfik's reign there were many evidences of financial disintegration, such as obdurate creditors, commissions of liquidation, an Anglo-French financial control, and the like. The burden of the fellaheen was almost unbearable. The cry of "Egypt for the Egyptians" meant much, and the Arabi rebellion, a direct outcome of the people's condition, menaced the authority of the Khedive, until stifled by an English fleet and soldiers in 1882. France, it is asserted, did not deem it necessary to bombard the Alexandrian forts held by the rebels, and, declining to share the responsibilities of such an act, her fleet steamed away from the Egypt in which Frenchmen had held sway from the coming of Napoleon in 1798.

Military and civil "occupation" by the British followed, its object being to restore the authority of the Khedive and repair the fortunes of the land by administrative reform. Consequently the year 1882 becomes the epoch from which dates everything current in discussing Egyptian affairs. The indebtedness when the reform policy was instituted reached nearly \$475,000,000, bearing six or seven per cent. interest, speaking generally. As a class Egyptian securities ruled very low on European bourses in 1882. "Unifieds" for a time were 46½, and other designations were even less. An average quotation for several months was 50, meaning that prudent investors would give only \$237,500,000 for the Egyptian debt.

It has never been possible to determine the nationality of holders of Egyptian bonds. Interest coupons are presented in London, Paris, Berlin and Cairo, and naturally at the place where exchange is highest, or where income taxes can be escaped. It is believed, however, that English people hold more than half of them. A British financier estimates that five-eighths better represents the stake of his country-people. If so, England's share of the debt in 1882 was about \$296,875,000, worth in the market \$148,437,500.

Entanglements of every sort beset the work of regeneration entered upon by Tewfik Pasha and the foreigners electing to labor with him. For years it was a neck and neck race with bankruptcy. Indemnification of Alexandrians whose property was destroyed

by reason of the rebellion, the military disaster resulting in the loss of the Soudan, and other inevitable expenses swelled the debt by nearly \$40,000,000. The soil—the sole producing agent of the country—needed better and more extended irrigation, and a fresh loan was actually negotiated in Europe to make useful the Nile barrage, at the apex of the Delta, regulating the supply of water used by the cotton cultivators.

At last fortune turned, and hypercritical Europe was satisfied of the solvency of the country of the Nile. It is a popular fallacy that the debt has been reduced since England's co-operation began: it has been materially added to. But the character of the security—in other words, the intrinsic worth of the country—has been so improved that owners of bonds have willingly reduced the rate of interest by nearly half.

Egypt's emergence from practical bankruptcy, with its obligations quoted almost as high as English consols, reads like a romance; and there is no better object lesson in economical progress, through administrative reform, than that presented by contemporary Egypt.

Taking the figures of the debt in 1882, with England's share estimated at \$296,875,000, and "Egyptians" now touching four per cent. premium, the appreciation is something enormous. The difference between the estimated value then and the known value to-day of England's supposed share is no less than \$149,625,000! Of course the advance has benefited all bondholders proportionately—French, German, Italian, Austrian and Russian, as well as English.

The amount and details of the debt at the present time are as follows:

Guaranteed loan,	3	per cent. (quoted $6\frac{1}{2}$ premium)	.....	\$42,442,866
Privileged debt,	$3\frac{1}{4}$	per cent. (quoted $1\frac{1}{4}$ premium)	.....	142,854,798
Unified debt,	4	per cent. (quoted $4\frac{1}{4}$ premium)	.....	272,037,625
Domain loan,	$4\frac{1}{4}$	per cent. (quoted 7 premium)	.....	19,418,421
Daira Sanieh loan,	4	per cent. (quoted $2\frac{1}{2}$ premium)	.....	32,191,589
Total bonded debt.....				\$508,945,299

This debt, applying as it does to an agricultural population of 7,000,000 people, where manual labor is worth from fifteen to twenty cents a day, and to only about 9,000 square miles of tillable soil—an area a trifle less than New Hampshire or Vermont in extent—is almost overpowering. Frenchmen and Englishmen owe more per capita, but their resources are incomparably greater,

and their creditors are their own countrymen. The American, owing about \$15, may well pity the lot of the Egyptian, who owes \$72.70.

The Egyptian question in its popular aspect is one of administration, rather than of politics, and that the work of establishing financial equilibrium has been successful is obvious. Recuperation has been brought about by checking waste and dishonesty, and developing the soil and adding to the cultivated territory by irrigation. The abolition of slavery merits universal praise, as does the suppression of forced labor for public works, with the attendant curse of the *courbash*. The improvement in native jurisprudence has likewise been conspicuous, for native courts now have more than a semblance of justice. The reduction by half of the price of salt, and railroad and postal rates, proves the wisdom of legislating for the earning classes, by double service.

Changes of any sort are made with difficulty, because of unique conditions. The cash box guarded by representatives of six European governments, and treaty privileges existing with fourteen powers, some of which are not in harmony with the present conduct of affairs in Egypt, make progress difficult. Hence the restoration of the country to easy prosperity, at a period when shrinkage in prices of cotton, sugar and grain has been great, must be regarded as a conspicuous triumph. Khedive Abbas and his co-workers, whoever they may be, have much to accomplish still. But system and economy now established, the attainment of permanent success will not be difficult.

It is too early for speculation as to the reversionary value of the Suez Canal. Yearly more and more necessary to commercial interchange with India and the bountiful East, sceptics assert that in time it may be treated as toll roads and bridges have been the world over—thrown open to the public, and maintained by a nominal tax on vessels using it, after the manner of lighthouses. It has brought Egypt into unfortunate prominence as strategical ground, certainly, and the prospect is not reassuring, say carpers, that the world's greatest artery of marine travel (responsible for the borrowing habit of past rulers of Egypt) will ever bring substantial benefit to the Egyptians. Some indemnification of Egypt would be demanded by public opinion, surely. Last year's tolls were about \$15,000,000, and for 1895 should be as good as \$17,000,000. In 1894 the British flag represented 71½ per cent.

of the traffic, as against $5\frac{1}{2}$ for France. The number of steamers passing through was 3,352. Next to England, Germany is the principal user of the canal.

As in other small countries, where the gulf between the masses and the upper class is wide, bureaucracy is a crying evil. It is estimated that two per cent. of the able-bodied men serve the government in some capacity. Nepotism formerly had full play, and it is difficult now to make the people understand that merit rather than favor should place one in the public service. Ministries and public offices appear to be overloaded with subordinates of every conceivable nationality. As a rule, the responsible heads of departments are Englishmen, but among the clerks more French than British subjects are found, and official correspondence is couched in French or Arabic. Salaries seem strangely out of proportion. Cabinet members are paid \$15,000 a year, and under-secretaries \$7,500—twice what Washington officials receive. Offices are open only in the forenoon, and five hours is the official day's work. In that halcyon period known as "the good old days," there were more civil servants in Egypt than in Great Britain, with five times the population. Thorough reform has yet to be accomplished, in the opinion of the economist.

The "international" aspect of Egypt is a hindrance to practical economy, say many. The Commission of the Debt, for illustration, brings to Cairo delegates of the powers which are the country's creditors. Each is paid a salary of \$10,000 by the Khedivial Government for watching the interests of his countrymen, who hold bonds quoted at a handsome premium. Having no voice in fixing the rate of interest or the amounts going to the different countries, it occurs to the reformer that a competent accountant could perform the service of these six men, with a great saving to the taxpayer. Also, the railway system of less than eleven hundred miles, is managed by three princely-paid men, acting for England, France and Egypt. Similarly, the spirit of internationalism dominates the Daira Sanieh, State Domains, and other divisions of the government, and aggregates a mighty draft on the exchequer. But the customs and post office departments, each with a single head, are models of perfection.

A striking feature of railway management in Egypt is that only 43 per cent. of the receipts go for operating expenses. Native labor and moderate speed of ordinary trains make this

possible. The governmental railways last year carried 9,827,813 passengers, and receipts from all sources were \$8,870,000. By reason of sweeping reductions in fares the number of passengers has been doubled in six years. Two years hence all-rail travel will be possible from the Mediterranean to the first cataract of the Nile.

Augmentation of winter travel to the Nile is helping the lot of the Egyptian materially. Last season's pleasure and health-seekers, 7,500 in number, distributed \$5,000,000 in the country, half of which came from Americans.

The purchasing power, held to be indicative of a nation's pecuniary condition, has kept pace with other statistics. In 1882 the imports were valued at \$32,127,650; in 1890, \$40,409,635; and 1894, \$46,330,000. Exports for the same years—cotton, cotton seed, grain and sugar—were valued at \$54,977,850, \$59,373,490 and \$59,420,000 respectively. Over fifty per cent. of the foreign commerce is with Great Britain. The cotton crop, wholly exported, produces nearly \$45,000,000. Of this, the United States buys about \$3,000,000 worth annually. The tonnage at the port of Alexandria has nearly doubled since 1882. Last year the arrivals represented 2,221,145 tons. That of French ships has multiplied at a rate unequalled by any other flag.

There has been vast improvement in the *morale* of the Egyptian army, and it is now as well disciplined and efficient as when General Stone and his American associates placed it on a stable footing a quarter of a century ago. It comprises 15,000 men, but with the military police as an adjunct in emergencies, the full strength is 21,000. Soldiers are conscientiously looked after, well clothed and fed, and hygiene is considered. The commander and seventy-six other officers are "borrowed" from the British Government and paid twice the amount of their home salaries. The common soldier gets only five cents a day. In the towns the practice is general to purchase immunity from conscription, costing \$100 a man, which adds considerably to the war office funds. The British Army of Occupation, garrisoning Cairo and Alexandria, numbers 4,200 men of all grades. Its status must be that of a component part of the Khedive's forces, although there is misconception regarding the matter. The red coats are in Egypt on liberal financial terms, for Egypt pays only the difference between the cost of home and foreign service. This is about \$435,000

a year. The British Government's share is about \$1,250,000 annually. There can be no monetary loss to the country in which they are quartered, for most of the soldiers spend all their pay, England's and Egypt's money as well. How long the arrangement is to be maintained is a problem which, like the fine distinctions between "occupation" and "protection," can only be treated by one writing of political Egypt.

To carry on the government requires about \$50,000,000 a year. It was more in times when budget-making was the merest guesswork, and deficiencies could be explained by the convenient phrase "insufficiency of receipts." The Budget of the current year allows expenditures of \$48,000,000, and is based upon receipts of \$51,300,000. Any balance will be divided equally between the governmental sinking fund and a reduction of the debt. The heaviest outlay is for interest on foreign indebtedness, \$18,854,185, while the annual tribute to the Sultan consumes \$3,325,205 more. The Khedive, khedivial family, and palace expenses coming under the head of "Civil List," call for \$1,169,305. To maintain the army and military police costs \$2,381,085, and civil and military pensions \$2,150,000 more.

Direct taxation on land, date trees, etc., produces \$25,000,000, the balance of revenue being made up by "indirect taxes"—customs receipts (eight per cent. on imports and one per cent. on exports), profit from the salt monopoly, stamp duties, receipts from railways, post offices, telegraphs, ports and courts of justice.

A reform of the greatest importance now in progress, is the adjustment of inequalities in the land tax, the present scheme being full of anomalies. It is not unusual to find land rented at \$30 and \$35 per acre paying only \$2.50 in taxes. In olden times there was no rule for its collection, and the collector went prepared to take from the farmer every penny his crops had produced, and then flog him into borrowing on mortgage any additional sum his rapacious master felt in need of. There was no pretense of fairness, and not until Tewfik's reign was a receipt of any kind given the peasant to show he had paid his taxes and that no more was due for the current year. Simple as it was, nothing more potent for alleviating the position of the masses was ever inaugurated. It was a reform that benefited every tiller of the soil, and was operative before "the coming of the English."

The scheme of taxation now in force is arbitrary and inequitable. A definite tax is specified for large tracts, which some of the land only is capable of paying. The work in hand is to base this schedule upon rental values, that each acre may be assessed commensurately with its producing capacity. The country is promised that the total tax—\$23,900,000 on the 5,237,200 acres of cultivated soil—is not to be increased. This means that the small holder is to pay less per acre, and the pasha landlord, once powerful enough to have his thousands of acres assessed at whatever he chose, will pay more proportionately. The glaring inequalities had been brought into prominence by the low prices of crops, and it had become imperative to devise a remedy.

It will surprise American farmers to know that their brethren in ancient Egypt, some of them, pay a land tax of \$8.20 per acre annually, and that the average tax for the country is \$4.56 per acre. This maximum tax is on lands in the Delta, possessing such exceptional richness that five hundredweight or more of cotton per acre is produced each year with comparative certainty.

The land tax has ever been the millstone about the neck of the Egyptian, sapping his energies and stunting his intellectual growth. The ancestors of the peasant now toiling from long before sunrise until after sunset, nearly every day in the year, have been farmers since the world began. What has their incessant toil produced? Nile farmers have ever been wretchedly poor, certainly.

To day's prosperity of the fellah, permitting him to have a few dollars after harvesting, to eat meat occasionally, and seek recreation at religious fairs, is of recent origin and slow growth. It began with the introduction of tax receipts, and has been nurtured at intervals by trifling reductions in taxation, as the area has been added to by irrigation at a rate in excess of the government's pecuniary needs.

Being humanely treated, the Egyptian to-day realizes that he is a human being, and it is the opinion of those capable of judging, that more has been done in the last fifteen years for him than ever before in a century. Tewfik Pasha inaugurated the good work, and the administration, headed by Abbas Pasha, is carrying it forward with intelligent perseverance.

The country's obligations to European creditors are sufficiently menacing to compel the small farmer to keep out of the

clutches of the money-lender at his gates, if he can. Nevertheless, the indebtedness secured by farm mortgages is greater than it should be, and critics allege this as certain proof that the boasted prosperity of the country is fictitious, and exhibit statistics to coincide with their argument. Critics of another sort array figures calculated to show that the aggregate mortgage indebtedness is very small, less than \$40,000,000, and that it is the large holders—owning from fifty acres upwards—who have pledged their property; and, further, that they have done this to buy more land, confident of an appreciation of values. It is a fact that the proportion of small holders borrowing by mortgage is trifling, and they are the people whose welfare first deserves consideration.

It is claimed that less than nine per cent. of the land bears mortgages, the aggregate indebtedness amounting to \$8 an acre. An average value of the cultivated soil is thought to be \$115 an acre.

Readers of mathematical mind, discovering that the foreign indebtedness represents definitely \$97.17 on every acre of productive soil, and adding the \$8 of home burden (probably understated), find that but little equity remains to the Egyptian, who for more than seven thousand years has been the most industrious and light-hearted of husbandmen. Simply speaking, it means an equity of only \$10 an acre; or, each inhabitant averaging three-quarters of an acre of productive earth, a remaining "margin" of \$7.50 per person. And his energy must not flag for generations to come, lest his fellow-creature in enlightened Europe be in arrears over his interest on "Egyptians." Blessed be Allah!

Egypt presents a striking example of a Mussulman country possessing a system of laws harmonizing with European and Western world civilization. Its international tribunals are unparalleled in the great domain of civil law, yet comparatively little seems to be known of them outside the Levant.

The "capitulations," or treaties, between the Christian powers and the Ottoman Empire regulating the privileges of foreigners within the Turkish dominions, some of which are many centuries old, occasioned so much confusion of jurisdiction in Egypt, where so many Christian nation-lities were represented, that Nubar Pasha called the attention of Ismail to the necessity for some reform, and himself drew up a project which was communicated to all the governments having representatives in Egypt.

As a result an International Commission assembled in 1869, under the presidency of Nubar, who was Minister of Foreign Affairs, and united in a report recommending the scheme. This was signed by the representatives of the United States, Austria, Germany, England, France, Russia and Italy. At subsequent conventions Belgium, Spain, Holland, Greece, Portugal, Denmark and Sweden-Norway approved the plan. On June 28th, 1875, Khedive Ismail inaugurated the Court at Alexandria, although it was not until February 1st, 1876, that the new system of jurisprudence was actually launched.

The procedure is practically that of France, the Code Napoleon, modified to suit the circumstances of a country where local custom and religious obligations must be respected. The jurisdiction is stated in this extract from the Code itself :

“The new tribunals shall have cognizance of all controversies in matters civil or commercial between natives and foreigners, or between foreigners of different nationalities. Apart from questions touching the *statut personnel* (questions of wills, succession, heirship and the like, which are regulated by the laws of the country of the individual), they shall have cognizance of all questions touching real estate between all persons, even though they belong to the same (foreign) nationality.”

It is of good augury for the national progress that the Tribunals have won the confidence of both natives and foreigners, and that the government bows to their authority. Europe needed no better proof of their efficacy than when Ismail and the government itself were brought before the Court of Appeal as defendants, having failed to meet obligations to foreign creditors.

An idea of the work of the Tribunals is given in the statistics of their labors from February 1, 1876, to October 31, 1894, showing that 135,555 suits had been instituted, and 130,449 terminated by decision. Thousands of suits have been concluded without decision—by arbitration or withdrawal. In addition to final decrees, many thousands of intermediate judgments and decrees have been pronounced ; and all have to be written out, not only as to terms, but motives justifying the conclusion of the court also.

The practice is common for a native having an important suit to assign his interest to a foreign friend, to give the International Courts jurisdiction of his cause, thus securing intelligent and fair consideration. Two years since, when some of the powers were dilatory in giving their adhesion to the extension of the

courts—for every five years there is a formal renewal—something like a panic occurred among the commercial community.

Courts of First Instance are located at Cairo, Alexandria and Mansourah, and the Court of Appeal is at Alexandria. The minimum pecuniary limit of appeal is \$400. Three languages are recognized in pleadings and documents—French, Italian and Arabic. The foreign counsellors of the appellate court, nine in number, receive a yearly salary of \$9,250 each, and their four native colleagues half as much. For the three lower courts twenty-seven foreign judges are employed, each receiving a salary of \$7,000, their fourteen native coadjutors receiving half as much. Five judges—three foreign and two native—sit at a time. The United States, like other great powers, have one representative in the upper, and two in the lower courts. While the Tribunals were not intended to be profit-earners, their receipts for years have been considerably in excess of expenses.

England's participation in the affairs of Egypt has not been felt in the Mixed Courts, where the English language and law are unknown. It is claimed there has never been occasion for British influence to show itself, the institution being strictly international, with thirteen other nations watchful of their rights. Consular courts still have criminal jurisdiction, in accordance with the original "capitulations" of the Sublime Porte.

The lay investigator meets many obstacles in an attempt to understand the procedure of the Native Tribunals, of which there are seven at populous points, with a Court of Appeal at Cairo, and many summary courts. Almost every variety of law is dealt in—organic, Koranic, usage, etc. Nearly 32,000 cases were decided last year in these courts.

It is the veriest fiction of thought that the Egyptian himself is being Europeanized, as one learning of the Egyptian administrative policy might infer. He is being superficially modernized only, which he does not object to so long as his beloved religion is not molested. At heart he is as unchangeable as the sphinx, and Islamism must ever dwell on the banks of the Nile.

FREDERIC COURTLAND PENFIELD.

THIRTY YEARS IN THE GRAIN TRADE.

BY EGERTON R. WILLIAMS.

ON viewing briefly the history of the grain trade for the last three decades, which measure nearly the limit of the writer's experience, the chief difficulty encountered is not that of calling to mind the many prominent changes, developments and their most important effects, but of giving full credence thereto; and this in the face of personal knowledge of many of them and of authentic statistical corroboration of many more. In no previous thirty years of this country's history has such phenomenal progress been made in all that pertains to man's material welfare—progress so far beyond any precedent that we are tempted to believe there can be no counterpart in the future.

In this article we shall consider the word "trade" not merely in the ordinary significance of traffic, but in the broader sense, inclusive of production and consumption.

The first effect of an extended and cheapened telegraphic service was the seeming drawing nearer to each other of the grain importing countries of Europe and the exporting countries of America, Asia, Australia, and Argentina, resulting in an almost complete abandonment of the old—and since Europe's infant commercial days—established custom of procuring and storing supplies several months in advance of their requirements. A hand-to-mouth system was adopted, purchases were made by cable, and time of shipment arranged to meet the wants of the European miller and corn factor. This new method brought about in time keener competition and reduced commissions or profits to the exporter, the importer, and the European factor.

The differences in value between the markets of consumption and those of production narrowed to an unprecedented extent, and this narrow margin for expenses and profit has, in exceptional

instances, continued ever since, and bids fair to continue indefinitely. This reduction in the cost of delivered grain inures, of course, chiefly to the consumer's advantage.

It is an anomalous condition of things commercial, but nevertheless generally true, that the more grain there is to be transported the less are the per-bushel-earnings of the inland and ocean carrier. The solution lies in the fact that, as a rule, large crops produce low prices, consequent upon supply being in excess of demand; and low freights are the usual accompaniment of low prices. The converse of this proposition is generally a commercial fact.

The railroads of late years have entered so keenly into competition with the Lake routes for the grain traffic that, to meet this speedy, effective, and cheap land transportation, the construction of steam vessels and tows of very large capacity and increased speed, became imperative. These lake leviathans require in the aggregate but few men for their management, and being run at very small expense, compared with other tonnage differently constructed, or, when their immense capacity is considered, have been able not only to successfully compete with land transit, but to make such minimum rates of freight as to result in driving from the traffic—if not from the lakes—vessels of small tonnage, and in placing a permanent embargo upon their further construction.

Freights have fallen from an average range on the lakes of 7-15c. to 1-3c.; on the ocean, from 10-15c. to 2-6c.; and all rail to the seaboard from 30-45c. to 9-15c. per bushel.

The adoption of the hand-to-mouth policy by our millers and dealers (and this same policy governs their customers and their customers' customers, until the purchaser of the 10-pound bag of flour is reached) is largely due to the narrow margin of profit generally obtainable. This profit is not very infrequently, particularly in large transactions, so small and unremunerative that a reversal of the old system is very often the safer course. Sale is made by the miller of his product, and by the dealer of grain or flour, before the purchase is effected. What can better illustrate the radical change a few short years have effected in business methods than we here find, in that, what at as late a period as the 70's was deemed hazardous gambling, indulged in by a few and frowned upon by a vast majority, is now commended and

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IN THIS NUMBER.

Eightieth Year.

Tros Tyriusque mihi nullo discrimine agetur.

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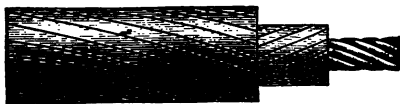
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helps to maintain that part of the government which it represents.

Much has been said regarding the feeling of jealousy existing towards the city of New York in other parts of the country. So far as the postal service is concerned, such a sentiment should have no place; because whatever is done to improve the service here finds immediate reflex of benefit everywhere throughout the land. The sooner the merchant can have his order for goods delivered here, the sooner the goods will be delivered; and so with the constant interchange of finance, no matter how far distant the point of interchange of letters; and thus it is that the perfection of the postal service in New York means that other cities of the Union near and far will grow towards occupying corresponding positions in the problem of postal magnitude and postal perfection.

There is no branch of the government nearer to the daily lives of our own people and to "all sorts and conditions of men" the world over. True economy in its administration consists in liberal appropriations, carefully and intelligently expended; and for every dollar so properly invested the government will receive, as it does in this city, a plentiful return.

CHARLES W. DAYTON.

FRANCE AND ENGLAND IN EGYPT.

BY MADAM ADAM.

AS FRANCE refused to shed Egyptian blood and to take part in the odious bombardment of Alexandria, she ought all the more energetically to have prepared herself for her peaceful struggle against the occupant of Egypt, thus serving her own interests, those of the oppressed people, and of those numerous colonies of strangers, which give to Egypt her peculiar character of internationality.

Every struggle allows of the choice of arms. Now what can one think of a combatant who is simple enough to change his weapon every day, and imprudent enough when he begins to use it well to deliver it over to his adversary? This is what the French government has done in Egypt since its occupation by the English. I shall first take for example a series of facts—as to the relationship which the traditional policy of France should desire to see continued between the governments of Egypt and of Turkey.

France had perhaps sustained Mehemet Ali in exaggerated fashion against the Sultan; Napoleon the Third was eager to obtain firmans which would deliver Egypt, under Ismail, from excessive vassalage and sanction its internationality. Tewfik, on ascending the Khedival throne, careful about the opinions of the foreign colonies in Egypt, had no idea of going to Constantinople to receive investiture and to make a personal act of submission.

When Abbas Pasha ascended the throne the English had not entertained for an instant the idea of sending the young Khedive to receive investiture at Constantinople, in spite of their conviction that one day or another—if Egypt returns to her traditions of vassalage—it would be the colonies of foreigners, always ready to resist the occupation of Egypt, who would suffer most. The Foreign Office has long known that at a given moment the Porte

may have diplomatic, financial or military need of England, and at that moment she may extort from it the protectorate of Egypt as she extorted that of Cyprus.

The English advisers occupied themselves only with negotiating with the Sultan on the subject of the firman of investiture to be received at Cairo.

The negotiations had for their object the transforming of Egypt's administration of the territories of Akaba and Sinai, in Arabia Petrea, into a definitive incorporation into Egypt itself, so that when the day of total absorption should arrive England should possess an important frontier on the Asiatic coast and both banks on the north of the Red Sea.

France then had a diplomatic success with which it would have been wise to rest contented. The Sultan replied to the English demands by publishing an *iradé* declaring that Akaba and the points occupied by Egypt on the east side of the Red Sea should be comprised in the Turkish vilayet of Hedjaz, and that for the peninsula of Sinai the *status quo* would be maintained. The ground, for the first time since "the occupation," was solidifying under our feet.

The Khedive had felt that the influence of France, combined with that of Russia at Constantinople, could overcome that of England and check it. The native population felt that we were not passive in the face of what was occurring, and this was an advantage which should have been satisfactory for the time. But our diplomacy—one knows not in truth why—and at the very time when the young Khedive was trying to encourage the pride of the natives by his own pride; at the very time when he was allowing the foreign colonies to foresee the possibility of some day finding again, in Abbas II., a proper representative of the Khedivate of Ismail, leaving to the foreign colonies the free play of a development which was exercising itself in favor of general progress; at that hour, I say, our Minister at Cairo, following either his own individual idea or the instructions of our government, commenced a systematic effort to deliver the Viceroy of Egypt again to the complete vassalage of the Sultan.

Our diplomacy was thus made to serve the future interests of England, the Ottoman influence being that on which finally English diplomacy has most power to act.

The rescript of the Khedive on his departure for Constanti-

nople was lamentable and of extreme importance in the sense that I indicate. In appointing Riaz Pacha, Kaimakan, that is to say Regent, Abbas II., used a phrase that neither Mehemet Ali nor Ismail nor Tewfik would have employed :

" Having made arrangements by the grace of God to repair to Constantinople to lay our respectful homage at the foot of our august Master, his Majesty the Sultan, etc."

This voyage, which superficially might appear as a provocation to England—the English advisers being opposed as a matter of form to it—French diplomacy gloried in as in a success, and her colony at Cairo had the imprudence to applaud it. The Sultan, who is one of the finest and most astute diplomats, took care not to neglect such advantages. He covered the young Khedive with flowers, but he made him follow the grand Vizier—thus reminding him that he was only a simple "Vali," and that Egypt is simply a Turkish province.

Thus, for an apparent success, French diplomacy forgot its traditional policy: Egyptian autonomy, and its separation from Turkish authority. At that moment I uttered a warning cry which, had it been heeded, might have saved the situation.

To-day they are talking of a direct understanding between London and Stamboul, and we have there, as I said at the commencement, not only changed our weapons, but surrendered our arms to England.

If France continues to act blindly so as to undo the work of fifty years, she will create with her own hands danger for the future. A direct understanding between England and the Porte may one day be very costly to Downing Street, but will help it to conquer a legal title in Egypt in the easiest manner. What results for our policy and for the independence of Abbas II. as regards England has the voyage of the young Khedive to the banks of the Bosphorus had? Results more than negative.

Through the flowers that were thrown to keep up appearances before the Mussulman world there was administered to the "vassal" at Constantinople a lesson which the English advisers of Cairo would not have repudiated.

Certainly Abdul Hamid could not answer with too much haughtiness the supplications of a faithful people, whose spokesmen addressed him in terms like these :

"O K̄haliff, we humbly approach thee, in submitting to thee, that the

stranger who came into our country, with false pretexts and with promises, periodically repeated, to go away, remains in occupation.

"O Khaliff, it is the land of Egypt, it is the sacred soil, it is the doorway of Mecca and Medina, whose people come before thee in tears, on account of him who is thy vicar, and thy representative, to render thee homage.

"Receive him with favor because he and we are blindly subject to thy will.

"Deliver us from the presence of the stranger, for we are like the bird caught in the net of the snarer, and put an end to our tribulation by the power of the sword of the Khalifate."

But so far the young Khedive has obtained nothing, not even the recall of the Ottoman Commissioner, of whom Abbas Helmi Pacha complained as not being sufficiently opposed to the English.

It is an illusion to believe that the Porte will ever break with London, where rightly or wrongly she expects help in the hour of financial crisis, or political peril. It is therefore a grave fault to have urged the Khedive to go to Dolma-Baghtché, and to have accentuated by act and by word the homage laid by the vassal at the foot of his august master.

If our diplomacy answers the fears of the "previsionists," as to the "opportunist" policy, by alleging that nothing has been lost, I would remark (beyond the bad results of the abandonment of a traditional polity, and of the greater intrusion of Turkish authority in Egypt) that in the place of an ardent young Khedive, impatient of the yoke, desirous of enfranchising himself, and thinking himself capable of doing so—and in consequence determined to push his way ahead—we shall see a Khedive more prudent, less audacious, as a result of the counsels of patience that have been given him, and who for the future will reflect twice before assuming a responsibility, or making a bold decision.

No personality is more engaging than that of the young Khedive trying to find an outlet through all the obstacles with which he is surrounded and with which the pathways of his destiny are blocked. Who knows if the Khaliff did not tell him to submit himself to England in the same manner that his father, Tewfik, appeared to submit himself. I use the term "appeared," for Mr. Chaillé Long, late United States Consul, ex-colonel in the Egyptian army, and chief of the American Military Mission under Tewfik, wrote to me after a speech by Mr. Gladstone:

"Mr. Gladstone praises Tewfik, and among the hitherto unknown quali-

ties of the late Khedive he attributes to him loyalty and devotion to Great Britain. I know myself the contrary. Tewfik told me, in an interview that I had with him in 1889, *that he cursed the English, that he detested them cordially; and he explained to me the horror and the hatred he felt for their domination and occupation of his country, which weighed horribly upon him.*"

Tewfik unable to control himself showed his spirit of revolt against the oppressor, and secretly placed himself in communication with the National party of Egypt. Then he died suddenly. His death fulfilled the wishes of Lord Salisbury. With Tewfik and his secret opposition getting more and more courageous, the noble Lord had anxiously awaited the approach of the general elections. Thus, he was ready for all audacities.

The very young Khedive who succeeded his father was of an age to submit without the least reservation to the most absolute tutelage. But note this mischance—at the first command given by Lord Cromer the English pupil revolted.

In an interview Lord Cromer explains his displeasure in words which give a shock of cold to one's heart. He said of Abbas II.: "He is young, *he has not yet suffered like his father the effects of rebellion, and perhaps he does not yet know the power of England.*"

Will the young Khedive be victorious over his tyrants, or will he be vanquished by them? It is to be desired that he may be clever and capable, so that he can extricate himself from the English machinations, and train the Egyptian people, so little as yet prepared for it, to assimilate the idea of nationality.

A book of the highest interest, which unveils the thoughts of England about Egypt, whose author is Mr. Milner, appears to me to sum up the question as follows:

Passive obedience of the Khedive of Egypt, who is bound to consider all "advice" coming from England as an "order."

"We have only the right to give counsel to Egypt," says Mr. Milner.

But Lord Granville, who is not often accused of being vigorous in his expressions, showed clearly to Sir Evelyn Baring in 1884 *that counsel did not differ from command.*

"It is indispensable," wrote Lord Granville, "for the government of Her Majesty, that the advice given the Khedive be followed. The ministers and Egyptian governors *who do not follow this policy must resign their positions.*"

Mr. Milner further cites the phrase of Lord Dufferin: "The

all-powerful hand of a resident will soon have curbed all under his will."

Thus Abbas Pacha can neither choose nor change one of his ministers without the authorization of his English adviser.

This pretension was made public on the occasion of what is known in England as the *coup d'état* of the young Khedive. In what diplomatic convention did the delegate of England, salaried by the Egyptian Government, acquire the sovereign right of *veto*?

England has not attempted to justify her temporary occupation except by proclaiming in an official act, at the bottom of which is the signature of her representatives, that she occupies Egypt only to maintain internal peace to aid in the proper working of the administration, and finally to give up Egypt to the Egyptians.

Perfidy and falsehood!

The most sincere man in England, the editor of *Truth*, Mr. Labouchere, wrote:

"The real gravity of the situation is that, up to the present time, we have justified our occupation and the violation of the undertakings which we have given Europe, by making the pretext, that we are prolonging the period of the occupation for the greater happiness of the Egyptians. It is not possible to play this game any longer, and to get people to believe we are in earnest.

"Rightly or wrongly, the Egyptians like better to govern themselves than to be governed by us. The action of Abbas is so manifestly approved by all his people, that we are strengthening our garrisons, not to defend Egypt against the Soudanese, but to defend our occupation against the Egyptians, and yet we are considering the simple expression of the natural aspirations—in favor of our departure—as a crime of high treason. . . . Like the Irish, the Egyptians want home rule. We cannot call this sentiment patriotism with the Irish, and treason with the Egyptians."

Voices are lifted up from time to time in England against the cynicism of the Egyptian occupation, but they are rare, and provoke the imprecations of the majority of the Liberal party itself, in spite of the promises made by Mr. Gladstone when he was leader of the Opposition.

Concerning the Blue Book published in March–April, 1893, and the dispatch of Lord Rosebery to Lord Cromer, which recalled to the young Khedive a lesson too soon forgotten, the *Globe* declared that it is

"Clear that England under a Conservative or Gladstonian Government will not retreat before her responsibilities."

The mockery of a speech of Mr. Gladstone, who humorously proved that France had not the same rights in Egypt as England;

the comedy of the interpellation of Sir Charles Dilke, stating after this public declaration that "even if the Liberal Government *did nothing towards carrying out its promises of evacuation* he, Sir Charles (author of *Greater Britain*), would not propose a *vote of want of confidence*." All went to prove that the Liberal party, then in power, had in its policy towards France one more fault than the Conservatives—impertinent hypocrisy.

Mr. Milner argues "that the Egyptians are incapable of acting for themselves as soldiers, as well as in civil affairs." They have, he says, need of being commanded and supported by individuals of "a superior race."

English pride is unbounded. Do we not know by the *Standard* of May 11, 1893,

"That there only is one Empire on the earth, the English Empire, and that the English race belongs to what Macaulay calls 'the hereditary aristocracy of humanity'?"

From time to time a loyal spirit tells the truth to his country, but he is forthwith classed as an eccentric individual, like Mr. Labouchere or Mr. Wilfrid Blunt, who published an article in the *Nineteenth Century* which attracted general attention, in which he confronts England with the falsehoods that she had heaped on the benefits of her occupation of Egypt.

A characteristic illustration of the tendency of the English—to find identical resources in all arguments good, bad or contradictory—is the astounding reply of the *Pall Mall Gazette* of March 29, 1893, concerning the picture of chaos and disorder made by Mr. Blunt.

"All that is false, but if it were true it would prove that England cannot abandon Egypt."

Unskillfulness, contradiction, disorder, waste, administrative injustice, inefficiency, unsurpassed crimes of "creatures" of the English, cruelties of the police—such is very nearly the balance sheet of occupation. Here and there certain monstrosities like the odious article in the *Egyptian Gazette* throw a sinister light upon the Egyptian situation.

"The line of conduct of England," ventured to write the official organ of England at Cairo, "appears to be to allow the inhabitants of the Upper Nile to die of hunger, just until those who survive have arrived at such a state of utter feebleness that the work of conquest will offer no further difficulty." To satisfy the

bondholders, to pay them a high interest, such is the sole ideal of her English advisers in Egypt; then under cover of this guarantee to ruin and starve Egypt, so as to place her more easily at its mercy. The holder of Egyptian bonds only sees one thing—27 millions of surplus in 1892 for the public revenue of that year, and 45 millions of surplus deposited for the payment of the debt. As to Egypt, if she exhausts and devours herself, what does that matter to the bondholder? When the English speak of their hard task, when they speak of a reserve fund of the debt, of the cultivation and perfected crops, and of abolition of *Bakhsheesh*, now driven away, they tell nothing new to those who have lived in Egypt under the reign of Ismail or Tewfik, at the epoch of the control of the condominium. At that period, things worked at least as well as now in Egypt. There was a *real reserve fund*, and the debt diminished, whereas it has increased 30 per cent. during English occupation, which is a pertinent fact. As to the contracts for public works and supplies there, no Egyptian will admit that they are transacted in regular and legal fashion, which is also a matter of some gravity!

These assertions have obtained for me the honor of being roughly handled by the partisan English press of Egypt, but they were never seriously denied.

Lord Granville exaggerated, in 1884, the reported ruin of Egypt. Further than this, by financial quotations, of which art the English are masters, and through all the jugglery, the balance of the budget of Cairo goes on improving.

But, while the apparent resources grow larger and salaries and pensions increase, England is multiplying new offices. She often undertakes public works which are frequently as excessive in number as they are useless.

Yes, Egypt pours into English coffers more money than she paid into Egyptian coffers, but neither the *fellahs* nor the general commerce become enriched in the same proportion. It is, therefore, by exhaustion and not by the creation of new resources that this has been done, and it remains to be discovered if Egypt has found in the cost of her new administration any compensation for her sacrifices.

To that one can answer "No," for the English themselves at Cairo are forced to admit to what an extent all the public ser-

vices are neglected. One of my friends wrote to me from there some time ago :

"The sanitary condition of Egypt is the cause of daily complaints. In Egypt, constantly threatened with cholera from India, the appropriation for sanitary purposes only amounts to seventy thousand pounds for the care of its five millions of inhabitants, while the rate of mortality reaches occasionally sixty per thousand."

The defective organization of the Egyptian army is notorious. They have not, moreover, ceased to lead them to certain defeat—in fighting the Soudanese.

The instruction of the army is deplorable, and what they have learned comes from the French and American missions, which the English wish suppressed. The only thing that the English have been forced to keep intact is the military school, which is in the hands of a Frenchman, *Larmée Pacha*, who could not be replaced, "the English not having sufficient instruction to take charge of the school." This is the exact phrase used by *Larmée Pacha* to Colonel *Chaillé Long*, who repeated the words to me. In an access of alcoholic folly did not an officer of the army of occupation burn the precious documents and scientific reports, the fruit of thirty years labor, of the officers of the French and American missions ?

The English have so little faith in their famous reorganization of the Egyptian army, that they constantly reënforce the army of occupation, which from 3,000 men has been increased to 10,000, thus further exhausting impoverished Egypt for this new expense. From time to time the English generals drag a portion of the native army to the Soudanese frontier. Then the tragi-comedy recommences. They repel an incursion of dervishes, a certain number of Egyptian soldiers are killed, and thus the "Soudanese peril" so dear to Lord Salisbury is renewed.

It would be necessary to devote many pages to prove that England deliberately lowers the standard of studies for the youth of Egypt, and that she endeavors to keep them in a state of ignorance which guarantees the invader against the claims of a host of young and educated patriots.

Those who continue the work of Mr. Milner will have a good opportunity in a few years to declare that the Egyptians are without any personal valor and need to be led by a superior race.

All the documents that have been communicated to me, and

that I have caused to be published and circulated by all the means in my power—by the press, by pamphlets and by republication, etc.—if I could give them in a short review article, would, without possible refutation, confirm what I have just advanced.

Here is one of the documents that I have received from a trusty source, and that I have already published :

“Mortgages on real estate and land in Egypt, which from 1893 to 1891 increased to the enormous extent of 30 per cent., are still increasing on account of the severity with which taxes are collected from the farmer. The mortgagees purchase for £15, sometimes for £10, lands which two or three years ago were worth £30 the feddan. At the present moment the lands of Lower Egypt, *belonging to native farmers*, are mortgaged at an average rate of 10 per cent. As a result of this, in about four years the half of these borrowers lose their lands.”

All that is the fruit of the occupation and of the systematic exploitation of the toiler, who fosters against the European a dangerous and daily increasing hate. On every side he runs against English implacability. Spurned, driven back, he is on all occasions the prey of those who invaded his country, with the solemn promise of helping him to govern it, and to deliver up Egypt to the Egyptians. They tell the oppressed one that he is poor and without intelligence—and they try to make him poorer and more stupid.

If I were to enumerate at length the English traps in which France and her agents have allowed themselves to be caught, the list would be a lamentable one.

The project of judiciary reform as expounded by Mr. Scott contains one of the gravest dangers to which foreign colonies are exposed in Egypt.

The matter may be summed up as follows—native jurisdiction is not yet in our hands, but we are preparing Egypt for its destiny of servitude to ourselves.

We will people it with our friends and creatures, and we will so manoeuvre that by and by the life and property of Europeans will be entirely at our discretion, and then we will dispose of Egypt. We will surround the fusion of mixed tribunals and native tribunals with all the appearances of guarantees and all imaginable promises. We will employ all the terms known to diplomacy, we will yield, we will make formal concessions, but we will gain our point.

When we shall no longer be hampered by the Consular Courts,

vestiges of a former epoch, and when we shall have lessened the power of the Court of Alexandria, we shall say to the Powers that, having suppressed for the Egyptians purely national jurisdiction they cannot require us to maintain for their benefit on the soil of Egypt all these foreign and distinct jurisdictions. "The arguments invoked for the creation of the Reform tribunals we will use in favor of our recombinations," say the English, and thus the Consular Courts and the "capitulations," the only protection for Egypt against our final seizure, will no longer exist.

What have we done up to the present time to struggle against the manœuvres of our rivals, of our enemies at Cairo? By what acts have we practically and continually protected Egypt against her gradual seizure by perfidious Albion? When have we taken in hand the interests of the oppressed Egyptian people? We have done nothing in favor of the oppressed ones and, worse still, we have been opposed to the abolition of forced labor. Our agents have often appeared not only to be tired of the contest against England, not only to be powerless to continue it, but more than once the attitude of our Ministers at Cairo has been, as one of our national Deputies recently informed me, "a source of encouragement to anti-French enterprises."

And it is at the solicitation of our agents that our government has given its consent to the worst measures against the future of France and the French colonies in Egypt.

Except in two instances—that of the license law, and the action of the Sultan as to Akaba and Sinai—let us frankly admit that since 1882 we have given up all courageous, intelligent, and far-seeing resistance to the English invasion of Egypt.

But now at last we clearly understand the rôle played by England for the past ten years—which is established by a thousand proofs—that in place of increasing the prestige and authority of the Khedive, she has lowered and broken them; that instead of aiding the native capacity in its development, she has simply crushed it; that sooner than help the local element, or enlighten the national spirit of Egypt, England would weaken them, and place her sinister influence upon them; that, in short, instead of working for the reorganization of Egypt for the benefit of the Egyptians, she has with implacable hate done her best to make such reorganization impossible.

It is necessary to conclude. To-day we have tested the probity of the Liberal party of England and its loyalty to its promises—let us struggle with the only arms that remain in our hands. Let us defend the rights of the people of Egypt; let us also protect those of the foreign colonies; let no concessions be made as to treaty rights; finally let us co-operate by our support with the Khedive, not in intrigues, but in his legitimate sovereignty, with the final aim, in accordance with equity and with the law of history, of restoring Egypt to the Egyptians.

JULIETTE ADAM.

A LAST WORD ON THE SOUTH CAROLINA LIQUOR LAW.

BY THE HON. B. R. TILLMAN, GOVERNOR OF SOUTH CAROLINA,
AND THE HON. W. F. DARGAN, MAYOR
OF DARLINGTON, S. C.

GOV. TILLMAN:

THE experiment of legislation for the control of the liquor traffic which has been made in South Carolina, during the year beginning July, 1893, has excited widespread interest. In previous articles in *THE REVIEW* I have given my opinion as to the merits of the Dispensary system, together with such facts as were then obtainable, tending to show the superiority of the Dispensary over the licensed saloon, from a temperance standpoint. Everything promised a speedy and almost total suppression of the illegal traffic in liquor, when, on April 19 last, the Supreme Court by a vote of two to one declared the Dispensary law unconstitutional.

It would be difficult to describe the surprise and disgust manifested by a large majority of our people when this intelligence reached them. The constitutionality of the law had been sustained by the United States Circuit judge; seven out of eight of the State Circuit judges had sustained the law; the Liquor Dealers' Association, of Charleston, had employed the best legal talent in the State, and had received it as the opinion of the attorneys that the law was impregnable and could not be attacked on its constitutionality. The Supreme Court itself, in a previous case arising under it, in May, 1893, unanimously declared:

"The only question really involved here is whether said act violates the constitution in forbidding the granting of licenses to retail spirituous liquors beyond the 30th day of June, 1893, and to that question we have confined our attention, and have reached the conclusion that the said act, *being in effect an act to regulate the sale of spirituous liquors*,—to do which is

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SIDELIGHTS ON THE EXPLOITATION OF EGYPT.

BY THE HON. FREDERIC C. PENFIELD, U. S. DIPLOMATIC AGENT
AND CONSUL-GENERAL TO EGYPT.

AMONG the nations of the earth stands one unique in history and in unusual and paradoxical conditions. Surprising and fascinating as it was to Herodotus, even so is it to the observer of to-day, who easily discovers why the Land of the Nile has so long been written of as Egypt the Mysterious, the Inexplicable, and the Unexampled. And the student who interprets the trend of current events must admit that the twentieth century will dawn on a new Egypt, Egypt the Prosperous, ruled by a Khedive thoroughly in earnest in his resolve to mark his reign as one of humanity and progress.

The country's political condition has no parallel. Nominally a province of the Ottoman Empire, it is also autonomous, subject to an annual tribute to the Sultan of about \$3,500,000. The title of its ruler means sovereign, or king, without qualification or limitation; yet the country is in a great measure administered by six European powers, who practically hold it in trusteeship for creditors, one of which is dominant and in "occupation" with an army and hundreds of civil functionaries. Egypt is purely agricultural, yet has no department or ministry of agriculture.

Whatever its degree of abundance in forgotten ages—and in Biblical times it was a land flowing with milk and honey—the era of utilitarianism and practicability, now fairly launched, will for the next few years be sufficient to draw universal attention to the old land of Pharaoh and Joseph.

Until recent years Egypt represented a large part of north and central Africa. But since Gordon's death and Hicks Pasha's defeat the process of territorial contraction has been rapid. The

whole of the upper valley of the Nile and the vast regions under Egyptian rule, extending almost to the Equator, are lost—"abandoned," say English chroniclers—and the deposed Ismail sees his hopes of a magnificent empire perish, never likely to be realized by his khedivial grandson.

But now comes the season of expansion—not to be accomplished by battling armies, diplomatic victories, or purchased acquisitions. Irrigation is to be the factor—the irrigation of definite science, rather than of chance or guesswork, and the scheme is grand enough to take its place with the building of the Pyramids and the Suez Canal. Stated simply, it is the doubling of the cultivable area of a country dependent on the soil

The Egypt of the map shows upward of 400,000 square miles, an area seven times as great as New England ; but the practical Egypt—that which sustains life—is not as large as the States of Massachusetts and Connecticut together. This is the ribbon-like strip of alluvial land bordering the Nile, and forming, strictly speaking, an elongated oasis in the desert. As readers know, Egypt is almost rainless and dewless. The exploitation is no less magnificent in conception than the forcing back of the Libyan and Arabian deserts so far that nearly two Massachusetts and two Connecticuts may be brought under the plough. This is exploitation in its true sense, and its accomplishment will be a verification of the saying that Egypt is the Nile and the Nile is Egypt.

The Pyramids and the Sphinx have borne testimony through the centuries to the grandeur and power of execution which dwelt within the Nile Valley. And what more fitting now than that the same valley be the theatre of a gigantic engineering exploit, audacious, but of almost certain results ?

Until recently the Nile was a blessing only half appreciated ; but a mightier Egypt is at hand, whose fertile fields will extend beyond the horizon upon those sands where now only the camel contends with primitive nature ; and the same Nile on which Moses was cradled will be harnessed to man's purposes and guided by canals far into that desert through which he led the children of Israel.

What an object-lesson in the application of science ! It can have no more interested observers than in America, especially in Colorado, Nevada, and California, and other States of the West,

where the irrigation expert is succeeding the railway builder as a developer.

I will claim a wider audience, comprising every person interested in cotton culture in the United States, however remotely. Thirty years or so ago, when that dauntless English traveller, Samuel Baker, gave to the world an account of his researches in equatorial Africa—which proved that the Nile had its origin in Lakes Victoria and Albert—he went so far as to say :

“The Nile might be so controlled that the enormous volume of water that now rushes uselessly into the Mediterranean might be led through the deserts to transform them into cotton-fields that would render England independent of America.”

To read these lines in the light of subsequent events, with England taking as keen an interest in Egypt as if it were part of the British Empire, causes one to ponder long and deep. Sir Samuel Baker was a far-seeing man; and his gift of prophecy was his strongest characteristic, in my judgment.

The expansion so generally discussed means more to the people of the United States than they realize. But I will treat the work in its universality, leaving the sidelights of American interest to be made apparent.

The question of irrigation was considered and experimented upon by the Pharaohs and Ptolemies; it must have been, as in their day Egypt was the granary of the world. When Napoleon conquered the country in 1798, his engineers and *savants* were given the task of augmenting the cultivation of the soil, that the peasantry might be lifted from degraded poverty. Mehemet Ali laid down the sword for the plough, and irrigation affairs have ever interested his successors. The Barrage, near Cairo, ministering to the fertility of the Delta, was built by them, with the aid of French constructive skill; and the reign of the present Abbas promises to be rich in triumphs of this order, whatever the nationality of the engineers whose abilities play a part.

Since the events of 1882, a feature of the British coöperation in repairing the broken fortunes of the Nile country has been enhanced irrigation. Engineers of other nations have devoted untiring study to the safe storage of the surplus waters of high Nile, that they may be systematically employed during the months of low Nile, when the whole country is athirst; and none more unselfishly than Cope Whitehouse, an American, who has spent the best

part of ten years and much money in an intelligent study of the subject, keeping it persistently before the notice of the Khedivial Government. His Lake Mœris project, however, is not considered adaptable to giving the thirsty upper Nile Valley its water for summer crops. It would be a boon to the Fayoom and the Delta, and may eventually be utilized. It is argued that the money to be expended belongs to every husbandman in the land, and that all should be benefited. This is a reason for placing the reservoir above Assouan, from whence its waters would reach every section of industrial Egypt.

As in the case of all great works, there are many plans and theories for accomplishing the same end. Each has points of merit, and drawbacks more or less grave.

To better assist the Public Works department of the Egyptian Government in a decision as to the best plan under submission, a committee of three European hydraulic experts was called to Egypt a few months ago, and the matter laid before them in its entirety. It has been generally spoken of as an International Technical Commission, and the opinion was current that it had plenary power to select a plan. I cannot discover why the commission was called "International," in a sense applicable to a country where six powers must be consulted on all questions involving unusual financial outlay, and fourteen powers on measures pertaining to judicial and sanitary questions. The commission naturally was headed by an English engineer, Sir Benjamin Baker, of Forth Bridge fame, and his associates were a Frenchman and an Italian. Every effort to have an American included, as advised by no less a judge of such matters than Sir Colin Scott Moncrieff, was futile.

The several projects were laid before the committee, presumably, to select the one possessing the most obvious advantages, independent of æsthetic and archæological considerations. Four contemplated the construction of a dam across the river; and another, originating with Whitehouse, proposed to employ a depression in the desert, which, when filled, would be as large a body of water as Lake Geneva in Switzerland.

Imagine the consternation of every person in the Old and New Worlds, of artistic or classical tastes, when the English and Italian members of the committee reported in favor of a dam seventy feet high at Assouan, which would bury from sight the

ruins of the Island of Philæ, that most brilliant gem in the diadem of Ancient Egypt. This was to art an unhappy verdict, indeed, whose devotees could not believe that the spoliation of Philæ was demanded. Every one applauded the magnificent prospect of increased prosperity to Egypt, but the clamor for another site was great—a site that would reconcile the interests of agriculture with those of history, art, and archæology.

Newspaper dispatches followed, stating that representatives of the Department of Public Works had gone to England with plans of machinery required for building the Assouan dam. This accentuated the feeling of horror to such an extent that the press of Europe cried out against the impending sacrilege.

Meetings have been held by many learned societies to protest against any disturbance of Philæ, and their memorials are pouring into Egypt. In England, the Society for the Preservation of the Monuments of Ancient Egypt has been untiring to save Philæ and the dozens of temples and remains in close vicinity. Besides its memorial, widely signed in England, Scotland, and Ireland, others of similar tenor and purpose have been prepared in France by the *Académie des Inscriptions* and by about 250 of the foremost members of the *Institut de France*. In Germany about 600 distinguished persons, including Egyptologists, professors, artists, antiquaries, archæologists, and literary men, have joined in a very strong protest. Sir Frederick Leighton, President of England's Royal Academy, has not hesitated to say that any tampering with Philæ would be a lasting blot on the British occupation of Egypt.

The ruins of Philæ are the most imposing and beautiful monuments of Upper Egypt, owing to their peculiar situation upon a rocky island commanding the passage of the Nile above the First Cataract. Assouan and this neighboring island are the objective points of hundreds of Americans every winter, whether they journey by the independent dahabiyah, or under the guidance of that universal benefactor, Cook, whose enterprise opened the Nile to travellers of moderate means or limited time. The German lines of steamers running from New York to Alexandria have made of Egypt the winter playground for thousands of well-to-do Americans, and many go to Philæ. Some visit the Nile for that purpose alone.

England's diplomatic representative, Lord Cromer, evidently

feeling that an outburst of disapproval would follow the announcement that Philæ was in danger, officially informed his government :

"It will, in the event of the Assouan project as it now stands being, from other points of view, considered preferable to any other, be necessary to consider what weight should be attached to the archæological argument based on the evident undesirability of submerging or removing the temple of Philæ. I still hope that some plan may be found for conciliating engineering necessities with the archæological interests which are at stake."

Mr. Garstin, the astute Under-Secretary of Public Works, an Englishman, one of whose associates had advised the removal of the precious temple to an adjoining island, or to lift the entire island of Philæ to a height clearing the flood line of the proposed reservoir, recorded his views in these words :

"Any work which caused either partial damage to, or the flooding of, this beautiful temple would be rightly considered by the whole civilized world as an act of barbarism. Moreover, it would be an act not absolutely necessitated by the circumstances, for we have other possible though somewhat inferior sites upon which to construct dams."

On the other hand Mr. Garstin says :

"Could the removal of the temple be successfully carried out, I cannot myself see that it would be an act of vandalism, which, as I read it, is a term meaning the wanton destruction of interesting relics."

Sir Benjamin Baker favors the raising of the island, as a whole, some twelve feet, and offers to do it for a million dollars, guaranteeing its safe accomplishment.

Think of moving Bunker Hill Monument to another site, or placing it on stilts, to reconcile it to a new order of landscape gardening !

The engineers who advocated the moving of Philæ did so because the Assouan site offered superior advantages from an engineering standpoint. The foundation of the dam would be a solid bed of granite. A situation farther up the river, at Kelabsheh, which would leave Philæ unmolested, would insure exactly the same benefits, it is claimed by competent judges, but the foundation would be sandstone. Public opinion is almost unanimous in demanding that it be adopted, if Egypt is to place on her frontier any dam ponding back a hundred miles into Nubia a body of water sufficiently vast to leave no living thing in Egypt's valley, were it liberated by foe or accident.

The French engineer advises against a great storage reservoir anywhere, favoring a series of smaller dams extending nearly to

Khartoum, to carry out which plan would necessitate a conquering army to precede the battalions of masons and diggers.

I would call the attention of scholarly America to the jeopardized position of one of the world's greatest treasures, in the country that begot science and learning. All talk about removing Philæ is too fantastic even for the pen of a Jules Verne. If its wondrous structures are disturbed at all, let them be re-erected on the Island of Rhoda, at Cairo. This would carry the spirit of utilitarianism to its utmost degree, and bring to the doors of the tourists' hotels one of the incentives of a winter's voyage up the Nile.

It is difficult to believe that the recommendation of the English and Italian engineers will not be set aside in deference to the opinion of that greater jury—the public.

To complete a Nile dam and its canals no less a sum than fifteen million dollars will be necessary. The money is actually in hand, the result of an economy effected by the recent conversion of a portion of the nation's debt from a high rate of interest. The six European powers will approve its expenditure in so promising an improvement, as a mortgagee favors the making of repairs on a bonded property, at the expense of the mortgagor. The Egyptian treasury will expect to be recouped, two or three years after the completion of the reservoir and its system of distributing canals, in taxes levied on the land as it becomes productive. Financially it presents a roseate future, certainly.

Naturally there will be obstacles, structural at least, whatever project is agreed upon. But those who express opinions publicly, in Egypt and Europe, touch slightly upon them. When one learns that the population is comfortably occupied with the cultivation of the present area, he appropriately asks where the increase of labor to till the double Egypt is coming from. Irrigation is not going to supply it, and it is not easy to induce the people of the Soudan and Nubia in any numbers to take up husbandry under Egyptian masters. I shall look to labor-saving machinery to solve the problem, however great the fellah's aversion to it, and I would like to see American implements and inventions succeed the slow-coach tools of mediæval times in the hands of those tilling the new Egypt.

Perennial irrigation is agreed upon by all taking part in the country's management, and it means much to the United States

of America, if those assisting the Khedivial Government possess the opinion expressed by their countryman, Explorer Baker, thirty years ago. Every acre wrested from the desert by the magical mud and water of the Nile will be capable of producing a bale of cotton, superior enough to command a quick market, presumably to the exclusion of a bale of American-grown cotton, for Egypt is already our aggressive competitor in that important fibre.

Whatever the crop may be in the Southern States, it surely is "king" in Egypt, with the Delta of the Nile for its throne. The soil and climate are so perfectly adapted to cotton raising that it is the governing crop, and brings enough money to the country to indirectly pay the interest on the enormous debt created by the lavishness of Ismail, and is so surely redeeming the land from the grasp of its creditors that Egyptian bonds have sold at a premium during the recent times of financial distrust.

Eight or ten years ago Egypt was insolvent. To-day she is bristling with prosperity. The position of the fellaheen is constantly improving. The *corvée* is abolished, and the people have no more compulsory labor, except to keep the Nile within bounds at high flood, for which they are paid. The land taxes are gradually being reduced, and extortion and corruption seem to have been stamped out. She sells cereals enough to pay for the imported articles necessary to maintain her simple standard of life. I can't help thinking that cotton—or the money it produces—has played a part of no small importance in the work of administration that has brought all these blessings.

A bird's-eye view of the area of cotton cultivation would give the outline of a half-opened fan. From the point of the Delta near Cairo it stretches nearly to Port Said on the northeast and beyond Alexandria on the northwest, this simile being helped by the great arc curving into the Mediterranean, the narrow strip devoted to cotton along the Nile from Cairo, a hundred miles southward, forming the handle. This area is veined with innumerable canals, branching from the Rosetta and Damietta arms of the Nile, which distribute the vitalizing waters.

The soil, first created by the deposits of the great river and ever fertilized by it, is perhaps the richest in the world, and is tilled with such ease and certain results as to compel the New

Englander who sees it to draw a comparison between farming at home and that occupation there. The Egyptian peasant is by instinct at once farmer and irrigation expert. With two or three primitive implements, such as a wooden plough, a mattock, and a water-hoisting "shadoof," his labors are blessed with success beyond the possibility of tillers of the soil elsewhere. The Nile, the cause of this fertility, brings from the Abyssinian mountains the deposit so wonderfully rich that other fertilizers are unnecessary, and the subsidence of the annual flood leaves the ground in a condition requiring scarcely more than a scratching with the plough to prepare it for planting. This done, the farmer has only to raise water daily from the river and direct it to the roots of his crops. Experience teaches him to "rotate" cotton with a less exhausting cereal, and he never has drought, frost, labor or tariff questions, or other serious menace, to deal with. His family supplies most of the labor, the women taking a lighter share of the work. This peasant has few ordinary comforts. He subsists on a meagre vegetable diet, receives no governmental documents dealing with agricultural facts and statistics, has no need for newspapers—in fact, only knows how to read the Koran. His concern in life appears to be, with Allah's help, to grow a good crop, harvest it at the right moment, and dispatch it to the nearest ginning establishment, get his cash, or be released from financial obligations, pay his land tax, and renew the lease of his farm. The land tax is heavy, and he has little money left after paying his rent to the landlord pasha, living in Cairo or Alexandria.

Added irrigation provided, what I have pictured as a half-opened fan—the Delta—may be unfurled on its western boundary almost indefinitely, and cotton would certainly have preference over other crops, as the Delta is given up to it. The incalculable increase of acreage there would come into definite competition with our country, while sugar and corn would naturally follow the alluvial extension between Assiout and Assouan.

This year's cotton territory is at least 1,072,500 acres. As desert soil is reclaimed, cotton cultivation is extended in preference to other crops, for Egypt's long staple commands a ready market at high prices. This accounts for the increase from 329,000 bales in 1882-83 to 680,085 bales in 1892-93. An Egyptian bale weighs from 700 to 750 pounds, against our bale of about 500 pounds.

Good Egyptian cotton brings from one to two cents per pound more than American upland cotton, owing to its superior staple and silky appearance, and the entire stock is exported. Last year it realized upwards of \$45,000,000. About ten years ago Egyptian cotton was introduced into the United States and its advantages so successfully explained to millowners of New England that the trade grew with astonishing rapidity, until the exportation from Egypt aggregated upwards of 42,000 bales in the season of 1892-93—the equivalent of more than 60,000 American bales—valued at over \$2,500,000, and constituting $2\frac{1}{2}$ per cent. of the staple consumed last year in America.

To the casual reader this will be surprising, and he will be slow to believe that the United States—which produce twice as much as the combined crops of India, Egypt, Brazil, Peru, Turkey, and the West Indies—ever imported a bale of raw cotton.

This year's cotton area is the largest ever planted in Egypt, and I can predict the greatest crop in the country's record, namely, 700,000 bales, or the equivalent of 1,050,000 American bales. This prognostication will reveal, to one who analyzes closely, that the Egyptian fellah gets what would be an American bale from an acre, while the Southern grower considers himself fortunate to secure a bale from two acres, as cotton lands run. Over-production has few terrors for the Egyptian, and he can stand a falling market better than the American grower.

Those interested insist that the use of Egyptian cotton is not antagonistic to home principles, for with its strong staple between an inch and an inch and a half in length, it is employed in the production of fine underwear, balbriggan hosiery, and fine threads requiring a finish for which home-grown cotton is unsuited. It gives to fabrics a gloss like silk, which makes it invaluable for use in cotton-mixed "silk goods." Further, it is claimed by those wishing to prove that it does not conflict with American cotton, that its use has developed a profitable business in manufactures for which the latter is not adapted; also that native-grown staple is utilized in a manner impossible without the imported article as a basis. What argument is made by Southern planters against the importation of this *coton de luze* I am not informed. The Egyptian cotton has almost entirely superseded American cotton abroad for the production of lisle thread goods. The extent of its introduction in this country would be

enough to show that it must be making even greater headway abroad. Outside the United States it is largely used where Sea Island was formerly.

Resourceful America, I believe, can fortify her position in this matter. The Egyptian staple having an admitted value for special manufactures, why should not our agricultural genius meet the want? The suggestion is obvious to one aware of the enormous demand for the Egyptian fibre, which is clearly a favorite. Who can say it will not be the cotton of the future?

With our range of climate and soil, any crop should be possible. One would suppose the Mississippi bottom lands would offer conditions approaching those of Egypt. I am glad to know that the Agricultural Department is taking a very active interest in this question. Experiments should be systematically pursued until the South can supply Northern mills with cotton as acceptable as that produced by the fellaheen of the Nile. The prospect of offering this particular staple to Europe in competition with Oriental labor presents little hope, as possible reductions in land rent and taxation would give the Egyptian—content with a fraction of the pay of the workingman of the South—a lead not easily to be overcome, without reference to the quality of his cotton.

A writer in a Boston journal, commenting on a recent communication by me to the State Department, on the subject of the marvellous growth of the use in America of Egyptian cotton, goes into an analysis of the business, admitting that the Egyptian article is a necessity for diversified manufacture, and that its use is more helpful than otherwise to our cotton manufacturing interest. He goes further and affirms that the cultivation of long-stapled cotton in the South can be effected only under forced conditions, high natural or artificial richness of soil, and comprehensive husbandry, costing money and intelligence.

If money and intelligence may be made useful in supplying domestic spindles with domestic fibre of the highest grade, we can command the situation, surely.

Cotton growers of India until recently believed they could not produce long-stapled cotton. Now, as a result of judicious experiment with Egyptian seed, they find they can, and purpose entering the field of competition.

FREDERIC COURTLAND PENFIELD.

THE RENAISSANCE OF WOMEN.

BY LADY HENRY SOMERSET.

WHAT has changed woman's outlook so that she now desires that of which her grandmother did not dream? This is the question that is asked to-day from pulpit and platform, in magazine and newspaper, with fatiguing reiteration. Is the woman of our time less feminine in her instinct, less domestic in her tastes, or less devoted to the interests of her family? As well might we ask whether the man of our time is less courageous because he no longer buckles on a coat of mail to wage an endless war with his near neighbour; less honorable because he does not avenge insult in a duel; less devout because he no longer believes that by conquering a distant land and planting the cross instead of the crescent on the heights of Jerusalem he is doing God's work in the world. Times have changed, and with the years the standard of social custom changes also. Woman, like man, is adapting herself to her environment. In ancient days her home was a great domestic manufactory of which she was the head. The flax was spun, the linen woven, by her deft fingers; the bread was baked in a glowing oven under her watchful care; and by her the perfume was distilled from summer flowers. She was the artist whose embroidery decked the cathedral and the palace; for home was not only the factory that supplied domestic wants, but the studio whence came the choicest objects of skill and beauty. But with the birth of applied science the marvellous invention of man robbed her one by one of her employments. The steel fingers of machinery replaced her skillful and ingenious hand; the city bakeries provided food; the sweet perfumes of flowers were perfectly imitated in a thousand chemical laboratories, and tapestries and silks were woven to the tune of steam while the roomy old homesteads disappeared and

rows of little houses took their place where operatives eked out a monotonous existence. The school with kindergarten attachment undertook to educate her children's powers; trained nurses watched over the pillows of the sick, and woman with folded hands looked out upon the world, her employment wellnigh gone. In view of such a situation, the reasoning mind must ask, Is not woman to adjust herself to these far-reaching changes, even as man has suited himself to the new environment that steam, electricity, and the printing-press have brought to him? The arts and crafts that centred for centuries in the home have expanded until they have become the possession of the world, and man has taken them under his supervision. Why, then, should not woman keep her native place in the world's economy by the regulation of that wider home which has now spread outside the four walls of her own house, and which we call society and government, and take her place with man in framing laws that affect the well-being of those who formerly worked within her kingdom, but who now dwell outside, in that larger family circle that we call a nation?

The arguments used by those who oppose woman's entrance to public life are in these days usually based on the line that woman is too sacred, her influence too pure and precious, to be frittered away in the sordid quarrels and mean ambitions entailed by party politics; that her presence has ever been the magnet of the home; and that the nation will be wisest and best that preserves the sanctity of its womanhood and the influence of its mothers. It is precisely because I believe in the truth of this argument that I maintain that to debar woman from any one single right, to exclude her from any prerogative, is to create for her not only a disability by reason of her sex, but to build up a barrier that must ever effectually hinder her widest influence. It is well to talk of the mother guiding the son in life, but from the hour that the boy understands that his mother's prerogatives end at the garden gate, that she has no voice whatever in the moulding of the nation's laws, that her precepts are good for the fireside but unavailing at the hearthstone of government, there insidiously creeps into the boy's thought a realization of the fact that his mother is classified by the rulers of the land with the lunatic and the idiot; and I maintain that this discovery has done more than sons are themselves aware of to undermine the influence that is

deemed so precious and yet which is sedulously preserved for "home consumption" only. Moreover, to deprive a government of the keen moral sense that is native to women as a class (though, to the great hindrance of humanity, they have too long admitted that their moral standard must necessarily be higher than that of man), is to rob the nation of a strong support by which it would undoubtedly benefit. Another argument that is brought forward to prove that woman does not need to have a share in government is that her interests are ably represented by men. If this be so, women are the only class "ably represented" by those who have in many instances a wholly separate interest from theirs. The very fact that the question of the woman's vote has been so long treated as a subject fit only for stale and silly jokes, or to be put aside with pompous platitudes, is in itself sufficient proof that women's interests are not guarded with the same care as men's; and the code of laws that places property in the hands of the husband, gives him complete power over the children, and protects him in conjugal authority over his wife, proves the impracticability of securing justice to women as a class until they themselves have an equal voice with men in the making of the law.

We have been told that woman's true work comes to her in the gentler calls of a sorrowing world; that her leisure should be spent in assuaging misery and suffering, and in the exercise of that charity which man has not the time or inclination to dispense: but there is probably no surer symptom of the change that is coming over society at large with regard to the great social problems of the age than the view now taken of the best methods of dealing with poverty and crime. This change is the outcome of the slow, but sure, sifting of social questions that is going on in the minds of all classes. Charity was considered to be a sort of moral patchwork; it was excellent for the soul of the giver, and helped the recipient to exist under circumstances that would otherwise have been intolerable. But it was, and is still, unconsciously, too often a mere ethical anæsthetic. We have many of us in England passed through the phase of going from cottage to cottage in country districts or in those village towns which abound in our land, listening to the oft-repeated story,—“twelve shillings a week, ten children, afraid to complain—the farmer from whom the wretched pittance is earned would turn us out. There was scarlet fever (or typhoid) in the village last year, the inspector came

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the different sections of the United Kingdom—all for the purpose of forcing on the nation a policy in which we had never believed, and which the nation, if the issue could be clearly tendered to it, free from irrelevant subjects of agitation, would manifestly condemn? We had never bound ourselves to Mr. Gladstone's leadership. We rejoiced, of course, when he gradually came over to us and carried Liberal measures, such as University Reform and Irish Disestablishment, which he had once opposed. We rejoiced when the most distinguished member of the Government which made the Crimean War, not only abandoned, but denounced, our Protectorate of Turkey. On the question of Free Trade Mr. Gladstone was always with us, and we knew how to value his support. Still, there were points of difference. Mr. Gladstone seemed to be unchangeably committed to the principle of English Church Establishment. He seemed also strongly attached to hereditary institutions, and we hardly knew of which party he would have become the leader if Disraeli had been out of the way. Bright left Mr. Gladstone's Government on the Egyptian Question, and I know that he felt strongly about it, though he was too chivalrous to attack in public the Government of which he had been a member. Our chiefs had preserved perfect independence, and when we went with the survivor of them on the Irish Question, we were being true to personal connection as well as to public principles.

Society, as was said before, may be at the opening of a new era and on the eve of a complete reconstruction. Even in that case it may be hoped that the champions of Free Trade, retrenchment, religious equality, peace, and "a government squared to the maxims of common sense and a plain morality," will be held to have done not badly in their brief day. How it will fare with our belief in liberty and property remains to be seen. If coercion and confiscation gain the day and make the world happy, our principles will lie for ever in the grave of extinct superstitions. Otherwise, *Resurgemus*.

GOLDWIN SMITH.

THE ENGLISH FAILURE IN EGYPT.

THE Englishman's bashfulness is proverbial, but it is not confined to the individual. The disease has attacked the nation as a whole, and is causing it to look back after putting the hand to the plough. The English have come to Egypt and there undertaken a task which almost rivals that of Sisyphus. In spite, however, of enormous difficulties—the greater part of which, it must be confessed, is of their own making—they have succeeded in introducing a little cleanliness into that Augean stable and in teaching the Oriental that there actually is such a thing as an honest official. Yet the English people are still mistrustful of their own work. I have been asked till I am tired of hearing the questions: "But are we popular?" "Do the natives like us?" "Are they grateful to us for what we have done for them?" "Have our reforms taken root in the country?" To all these questions there is but one answer—No!

The English are *not* liked; their influence and *prestige* are less to-day than they were three years ago, and with the departure of their red-coats, their reforms also would vanish into air. Within six months scarcely a trace would be left of the latter, except in the reaction which would inevitably follow. English ideas and work in Egypt would be stamped under foot more effectually than was Puritanism after the Restoration. There is not even a remnant of the native population which would be faithful to them. The Englishman at present does the work and the native looks on, sometimes antagonistically, sometimes wonderingly, more often with apathy. Since the beginning of this century the Egyptians have been accustomed to seeing their country made the victim of European *doctrinaires* and speculators, but the experiments have never lasted longer than was needful to leave the subjects of the Khedive worse off than they were

before. Why should not English reforms meet with a like fate? Now and then, indeed, a native is found who seems to have assimilated the spirit of his English superiors, and in whom they fondly hope to have a colleague, if not a successor; it only needs a slight shock to English influence to show that his sympathy with English ideas of reform was but skin-deep. The recent case of Maher Pasha is a case in point.

Such is the result of twelve years of occupation and ten of practical government. The public at home may well ask why this should be so? The causes are numerous, but there are two which far outweigh all others. One of these is the ready way in which the English official has been made to ignore his own presence in the country. Whatever benefits he may have bestowed upon the natives have been ascribed to the Khedive, his native Ministers, or the Sultan—to every one, in fact, except their real authors. The English occupation of Egypt may be a veiled Protectorate, but the veil is so thick that the ordinary man cannot see through it. Now and again, it is true, it has been torn aside; but this has been in despite of the English administration, and in consequence of deplorable “incidents.” Then, to the surprise of the Egyptian, another power has shown itself behind that to which he has been told to look up, and in opposition to that from which he has been taught to believe that all his benefits have been derived. This is the power of England, seeking to undo the *régime* which has been so good to him, but retreating again as soon as it has been fooled by one of those verbal concessions of which the Oriental is a master. While the machinery works well, while taxes are lightened and equal justice is administered, nothing is heard of England and the English; it is only when tobacco is forbidden to be grown, when a patriotic Khedive is humiliated, or the army of occupation (and therewith its attendant charges) is increased, that the hand of England shows itself. In the management of Egypt, English national bashfulness has been carried to an extreme, and last winter we had an example of what might be expected from such self-effacement. The Khedive and his Ministers had really begun to share the belief of the rest of his subjects that they were the *de facto* rulers of the country, and they acted upon it accordingly. Attempts were made to tamper with the Egyptian army, and it was only the prompt action of the Sirdar which prevented consequences of the most serious nature. The Egyptian is of all men the least able to understand a government which is not personal; a power, therefore, which makes itself felt only when an “incident” occurs, is a power for which he not only has no respect, he is not even able to realise that it exists.

If, then, England is to expect gratitude from the Egyptian, or even simple recognition of the services she has rendered his country, she

must cease to play her present game of hide-and-seek. Were it not for the English officers of the Egyptian army and native police and the irrigation officials there would be little sign of her presence. And as these necessarily act in the name of the Khedive, the Egyptian naturally concludes that they are as much the creation of Abbas II. as they would have been of Abbas I. The Khedive accordingly is regarded as the author of whatever measure of justice and well-being the *fellahin* now enjoy, and any attempt to oppose or humiliate him on the part of the English becomes a plain proof of their hostility to the good government of the country. If only the English army of occupation would depart and the Khedive be allowed to carry out his philanthropic plans without fear of hindrance, the valley of the Nile would return to the Golden Age.

But, it will be said, such ideas are confined to the *fellahin*; the educated native knows better. Apart, however, from the fact that some of the best educated men in the country are to be found among the well-to-do *fellahin*, this is by no means the case. The educated native of the town ignores the English initiative and control quite as much as his brethren in the country. And with good reason, since except when an "incident" occurs any such initiative is studiously hidden out of sight. The motive force is invisible except when the machinery goes wrong. And then it is discovered that without the motive force the machinery cannot move, at all events in a desirable direction. But the discovery is made chiefly by European officials and journals; the Egyptian either never makes it, or forgets it immediately afterwards.

This is in great measure due to the second and perhaps primary cause of the little hold English ideas of reform have taken upon the Egyptian mind. It is a cause, the gravity and importance of which can be fully realised only by those who have lived in Egypt. England has not only effaced its officials, she has also effaced the English language. There are natives indeed who know the English language, but they are chiefly to be found among the donkey-boys, the dragomans, and the shopkeepers who are brought into contact with the tourist. The official European language of the country still remains French. The absurd spectacle is presented of English officials writing and speaking to one another in bad French, sometimes to the miscarriage of the business in hand. The result is that the native who desires an official post—and what native is there who does not desire one?—is obliged to make French the European language which he specially studies. If he adds to it a knowledge of English, this is but a work of supererogation, and in a country where everything is judged by its pecuniary value, works of supererogation are necessarily rare.

French, consequently, is the only European language which is really known to any extent by the vast majority of educated natives.

It is the only one which they can read with any facility, and therefore the only one which is read by them. Such Europeanised ideas as they have are supplied by French novels and Egypto-French newspapers. The moral consequences of a training of this kind may be easily imagined. The French novel which falls in the way of the Egyptian is not calculated to improve his moral character; too often it destroys what little he possesses. But the moral consequences of excluding the young Egyptian from what we believe to be the purer literature of the English-speaking race, we do not now wish to dwell upon; it is the political consequences to which we would draw attention. The hostility of French journalism to the presence and work of England in Egypt is notorious, and nowhere is it more acrimonious or less regardful of the truth than in Alexandria and Cairo. And yet it is from this poisoned source that the larger part of the educated class of natives derives its views of English work and English policy. Every effort is made to pervert and misrepresent them, and to inculcate the belief that they are evils to be got rid of as soon as possible.

Nor is the influence of French journalism confined to those who can read the French language for themselves. It is disseminated through the country by the native journalists, whose knowledge of French and ignorance of English throws them for their information and ideas upon the French newspapers. With the exception of the *Mokattam*, which the Egypto-French press is perpetually seeking to discredit on the ground that its editors are Syrians, the Arabic newspapers of Egypt are either wholly or in part in the Egypto-French interest. And the influence of these newspapers is but imperfectly realised in England. They penetrate into almost every village of the country, they are read aloud and discussed at the cafés, and their words are regarded as the utterances of an oracle. The official class of Egypt is already as a body anti-English, full of deep hatred or mistrust of English efforts and methods of reform, and the other classes of the country, thanks to the Arabic newspapers, are rapidly becoming so too.

History and science alike teach us that the surest, if not the only, way of influencing a community is through the language with which it is familiar. This is a truth which was recognised by the Roman Empire, and which is recognised to-day by France, but it has never been recognised by the rulers of England. They have left education to take care of itself, and regarded law and finance, public security and national defence as alone worth the attention of a politician. But they have forgotten that unless a people is educated into understanding and appreciating the laws and administration of its government the latter are but a house built upon the sand. How is it possible for the rising generation of Egyptians to sympathise with the English

measures of reform, much less to co-operate with them, when the European education they receive is so contrived as to make them believe that these measures are so many evils forced upon them by a foreign tyranny, or else, in so far as they are beneficial, not English measures at all? How can they be expected to enter into and assimilate the spirit that underlies the English administration of Egypt when such European training as they get is diametrically and openly opposed to it? If England wants to educate Egypt into carrying out English ideas and political principles, she must begin with the root and not with the crown of the tree. To imagine that the reforms she has initiated can be carried out by those whose intellectual training and attitude are not only unsympathetic, but antagonistic, is worse than absurd; it is a political blunder of the first magnitude. The mind and spirit of a nation is reflected in its language, and so long as the European language of the Egyptian official remains French his political mode of thought and action will be French also. And in Egypt this means Egypto-French.

As might be expected, every year sees the French language, and therewith the influence of Egypto-French journalism, gaining a tighter hold over the native official mind. The rising generation is better educated than its predecessor, and therefore it has a better knowledge of the European language to the acquisition of which its best energies are devoted. It takes accordingly an increasing pleasure in reading such French books and newspapers as fall in its way, and in forming its opinions from them. Moreover, the schools of the American Mission in which English was made the school-language, and from which most of the English-speaking officials have come, have been practically superseded by the Government schools in which French holds the chief place. French is fast becoming the single European language of the railway and postal services, so far as these are not worked in association with Messrs. Cook & Sons, in spite of the fact that the vast majority of European travellers in Upper Egypt during the winter months are English-speaking tourists, many of whom do not speak French. Formerly there were always clerks at the Central Post-office in Cairo who knew English; now it is possible for the English soldier who speaks neither French, Italian, nor Arabic, and wants information, there to be obliged to have recourse to the language of signs. A whole department of the public service—that of the conservation of the antiquities—has been so completely handed over to the French that an Englishman is not even allowed to hold a post in it; and as it is just this department which is most in evidence throughout the country (as opposed to the capital) it is naturally the language of this department which has the most chance of being cultivated by the natives. The innocent attempt lately made *in Cairo to encourage a study of English among the Egyptian boys*

by giving prizes for proficiency in it, has been officially suppressed, and notices which only a short time ago appeared in the official journal in English are now published in French.

Those of course who are anxious that the English occupation of Egypt shall be indefinitely prolonged will doubtless regard such a state of things with satisfaction. England has undertaken to remain there until the reforms she has set on foot can be safely left to the native Government to carry on. But unless the younger generation of natives is taught to read English books and papers, and so to assimilate English modes of thought and moral and political principles, she will have to remain there till doomsday. English reforms, as things are at present, would all vanish on the day of the departure of the British army, and on the day following they would be replaced by the exact contrary. About this there ought to be no mistake. We cannot really influence the mind and *morale* of a people except through the language in which they are taught to think and feel, and as long as England neglects to educate the Egyptian in English modes of thought and action, the edifice of reform she has been slowly and painfully building up in the valley of the Nile will prove to be a mere house of cards.

A CAIRENE.

THE EXPERIENCES OF AN ANGLICAN CATHOLIC.

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THE pain and sorrow that I feel at the course of action adopted by the Archbishop of Dublin, in the matter of the consecration of a Spanish bishop for the small dissenting community which has separated itself from the Catholic Church in that country, lead me to lay before your readers some account of my own personal experiences, and of the difficulties I have had to face, and for the most part, I humbly hope, have surmounted, in my fidelity to the great principle of Catholicity.

I was born and brought up a member of the Society of Friends, and, in looking back on the associations of my early life, I am bound to admit that, in all my varied experiences since I emerged from that condition of religious ignorance, I have never met with more beautiful examples of the highest Christian character than were exhibited by several of those who then belonged, and, if living, still belong, to that heretical sect. Since I have learnt to believe that it is through the sacraments that the divine grace which enables us to lead a really Christian life is conveyed to us, I have often marvelled how it is that the distinctive features of the Christian ethos are so strikingly apparent in those who have neither part nor lot in the sacramental system. I remember once putting this difficulty to a clerical friend of mine who was a strong Catholic, though, I am afraid, a somewhat weak Christian. At any rate, in consistency of life he was certainly much the inferior of those of whom I was thinking. His explanation was ingenious, if not conclusive. It was to the effect that most probably the devil made things easy for such persons, in order that their amiability and virtues might lead others to be less disposed to avail themselves of divine grace in the sacraments, concluding, as they naturally would, that such a high standard of goodness proved these

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NILE RESERVOIRS AND PHILÆ

THE International Technical Commission, appointed by the Egyptian Government to consider the various proposals of the engineers of the Public Works Department for the establishment of reservoirs of unprecedented magnitude for the storage of the flood water of the Nile for summer use, has just finished its three months' investigations. Although the Report has not yet been published, there can be little indiscretion in referring to its contents, as the desire of the Egyptian Government and of the Public Works officers throughout has been for the amplest and most unbiassed discussion of the whole question, so that, in the words of Lord Cromer and of Mr. Garstin, the Under-Secretary of State, the course followed may be 'the one best calculated to serve the interests of the country,' and that 'what is wanted is that Egypt shall have the best possible reservoir, whether it be in the Wadi Rayyan or in the Nile Valley itself.' Having regard to the position which Great Britain at present holds in relation to Egypt, and to the fact that she has assumed the responsibility in the eyes of Europe for the proper management and development of the resources of that country, any proposal of such far-reaching magnitude as the establishment of reservoirs, and the changing the system of agriculture of vast areas of land in Middle and Lower Egypt deserves the most serious and unprejudiced consideration of all thoughtful people in this country. The essence of the question is not whether Philæ temple may or may not be more or less interfered with during British occupancy, but whether, whilst having due regard to the susceptibilities of European scholars and tourists, Great Britain has made the amelioration of the condition of the hard-working and tax-laden labourers of Egypt her first consideration, and has not from timidity or a reluctance to face the opposition of those prepared to fight any British proposal in Egypt, postponed until to-morrow reforms which might have been carried out to-day.

Immediately on completion of the four years' exhaustive study of the reservoir question by Mr. Willcocks, the Director of Reservoirs, and his large staff of engineers, Mr. Garstin, the Under-Secretary of State, summarised the results of these studies in a Report to the Egyptian Government which, from its masterly exposition of essential details and its absolute impartiality, would appear to have been rather

the summing-up of one of her Majesty's judges than the report of an engineer. In this report Mr. Garstin suggested the appointment of an International Commission to revise his own conclusions and those of the engineers of his department, and as a result Sir Benjamin Baker, K.C.M.G., was appointed British Commissioner; M. A. Boulé, Inspecteur-général des Ponts et Chaussées, French Commissioner; and Signor G. Torrecelli, Professor of Agricultural Engineering, Italian Commissioner. In the course of their investigations the Commissioners inspected the Wadi Rayyan depression adjoining the Fayoum Province, or site of the ancient Lake Moeris, and also the route of the thirty-two-mile long canal to connect the depression with the Nile, and the whole of the Nile Valley itself as far as the second cataract at Wadi Halfa.

Up to the present time the chief interest manifested in this country with regard to the vast works proposed by the representatives of Great Britain in Egypt for the improvement of the condition of the most needy of the large agricultural class in that country has been in connection with the ruins on Philæ Island. In Egypt, on the other hand, one hears perhaps too little of the ruins, as, in the opinion of those interested, the question of one temple more or less dwindles into utter insignificance as compared with the vast material benefits which even the most ignorant of the fellaheen know must result from the establishment of a Nile reservoir. This marked contrast in the views of the two countries no doubt must appear strange to the middle and upper classes of the natives, who are constantly being reminded that England is in Egypt, not for her own benefit, but in the interests of Egypt herself. It is, however, doubtless only a temporary phase of feeling in this country, due to an imperfect knowledge of the circumstances of the case. On first impulse probably ninety-nine out of every hundred cultivated persons would say Philæ must not be touched. On a thorough examination of the facts, however, it is no less probable that the same percentage of persons would endorse the conclusions of the Public Works Department and the majority of the Foreign Commissioners, that some interference with Philæ is an absolute necessity in the interests of Egypt.

To understand the Egyptian way of looking at the question, let us assume, for example, that the London County Council had discovered some cheap and easily-executed plan for clearing the Thames of sewage, annihilating London fogs, and at the same time solving the great problem of agricultural depression throughout the country. Incidental to this scheme, however, there was involved an interference with some picturesquely situated ruins—say Tintern Abbey on the Wye, which the guide-books tell us are, 'from the beauty of the situation and the elegance of the building, the most romantic Cistercian ruins in Britain.' Should we not deem it very unsympathetic, *to say the least*, if the American public, instead of congratulating us

upon the good things in store, called us 'Vandals' and other uncomplimentary names because we ventured to contemplate any interference with ruins which they visited and appreciated so much? This, without exaggeration, is in Egyptian eyes a parallel case to the Nile reservoir and Philæ question, and it is no wonder, therefore, that some disappointment is felt in Egypt at the way in which the latter has hitherto been discussed in England, and the sooner this is set right by dealing with the subject on a broader basis, the better for all parties.

All reasonable men—and in no matter is it possible to satisfy faddists—will agree, whether they be artists, archæologists, or engineers, that if a reservoir be absolutely essential to the development of Egypt, and no other practically available site exists than the one involving an interference with Philæ, then all the sacrifice that can be legitimately demanded of Egypt is that the interference shall be the least possible. This is in accordance with the action of Parliament in this country in relation to railways, the construction of which constantly and inevitably involves interference with cherished objects and the destruction of the picturesque. It is in accordance also with the course followed by other nations—notably in the case of the Tiber improvements through Rome, where, to facilitate the discharge of the flood waters, several of the historic bridges have been pulled down and rebuilt with the original stones, but on deeper foundations. The most important and responsible duty of the International Commission, therefore, was first to satisfy themselves that a reservoir of some kind was a necessity; and secondly, if so, whether it could not be placed elsewhere than at Philæ.

The Government engineers submitted four projects to the Commission; but, reading between the lines, it was clear enough that they had little confidence themselves in the practicability or expediency of three out of the four plans, and they expressly threw the final responsibility of rejection upon the Commission. The questions to be considered by the Commission, at the request of the Government, were five in number. (1) The proposal to construct a dam at some point of the Nile between Wadi Halfa and Cairo, and to form a storage reservoir in the valley of the river itself. (2) The proposal to construct a storage reservoir in the Wadi Rayyan depression in the desert. (3) An examination of all the designs, plans, and estimates prepared for the different projects. (4) An opinion as to whether the sanitary condition of the country will be affected in any way by the storage of such a body of water as is now proposed. And (5) A selection from among the different projects which have been submitted for the information of the Egyptian Government. It will be observed that the question of Philæ temple was not referred to the Commission, but, on the contrary, it was expressly stated elsewhere in the Report that 'this was a question for the Government to decide.' Neither was the question of the necessity of a reservoir referred to them; but yet it

was, of course, absolutely impossible for them not to have these two questions ever present in their minds.

As regards the absolute necessity for the construction of a reservoir with the least possible delay, no shadow of doubt was expressed by any member of the Commission. The estimated direct ultimate annual return to the State was over three-quarters of a million sterling, and the increased value of the crops would result annually in a benefit of ten times that amount to the cultivators. Making every allowance for possible errors in the estimating, the margin of profit would still be so enormous that no project could be suggested in any part of the globe which would at all compare, as regards financial results and benefits to the country at large, with that of the Nile reservoirs. This being so, it may reasonably be demanded by sceptical financiers why this mine of wealth has been so long neglected, when even Central Africa is being exploited by all the European Powers. The answer is simple. Until the barrage at the apex of the Delta had been sufficiently strengthened by Sir Colin Scott Moncreiff, and Colonel Western, to enable the whole of the existing summer supply in the Nile to be thrown on the lands, it was useless to augment that supply by the construction of reservoirs. The barrage referred to was built forty years ago by an eminent French engineer, Mougel Bey, but from the reckless rapidity with which he was compelled to carry on the works it was a practical failure until the past two or three years. At present, however, by its means every drop of water at low Nile is thrown upon the lands, and so valuable is the water that the sluice-gates are even caulked with rags to stop the smallest waste. Notwithstanding this, the demand for water by the cultivators is as great as ever, and no means exists for satisfying their wants but by storing up the water which runs uselessly to sea during the flood for use when most required. By the construction of the proposed reservoirs the flow down the Nile when water is of the highest value will be considerably more than doubled, so no detailed calculations are required to show that the direct and indirect returns to Egypt must be enormous,⁵ and that the condition of the cultivators will be vastly improved. To illustrate the extent of the change it may be mentioned that Mr. Foster, the Inspector-General of Irrigation for Lower Egypt, estimates that in the small province of Giseh alone the area under summer crops will be increased from 5,000 to 60,000 acres, and as the average value of the summer crop is no less than 10*l.* per acre, there would be a nett increase of over half a million sterling in that little district itself.

It was easy enough, therefore, for the Commissioners to satisfy themselves that they could not evade the difficulty of selecting a reservoir site by saying that no reservoir at all was necessary, and it devolved upon them to consider in full detail each of the four projects *prepared by the Government engineers*, as well as any others that might

occur to them as a result of their own personal inspection of the Nile Valley. The first project examined by the Commission was Mr. Cope Whitehouse's Wadi Rayyan reservoir, which, as all the world knows, consists in the conversion of a deep depression in the desert, discovered by him, into a vast lake of nearly three hundred square miles area. If the British Commissioner had any views on the question of Nile reservoirs before undertaking the investigation of the problem, he must confess it was in favour of Mr. Cope Whitehouse's brilliant and original suggestion, and it was a matter of regret to him that as the investigation proceeded one difficulty after another appeared, and so the realisation of the scheme was rendered far less easy than he had originally anticipated. Coming fresh from experiences on the Manchester Ship Canal, he knew that nothing was more difficult to estimate than the apparently simple work of an excavated channel for water through doubtful soil; and in the case of the Wadi Rayyan project the depression was so remote from the Nile, and the depth of cutting for the connecting canal was in places so great, that the cost became excessive, due regard being had to the contingencies attaching to the work. The Commissioners were unanimous in the opinion that the Government engineers had largely under-estimated the cost of the Rayyan project; but it was explained to them that the engineers were specially instructed, in cases of doubt, to give the advantage to the project, so that it might not be said that they were biassed against Mr. Cope Whitehouse's scheme. Apart from cost, moreover, the Commissioners were unanimous in the opinion that, even if executed, the Rayyan reservoir would not meet all of the requirements of Egypt, and that certain elements of doubt attached to it as regards the supply of water at critical times and the effects of percolation.

The second Government project examined by the Commission was that for a dam across the Nile Valley at Gebel Silsila about fifty miles down stream of Philæ. At this point the rock was found to be inferior sandstone with bands of clay, easily acted upon by water, and the Commissioners were unanimous in rejecting the Government project on the grounds of insecurity alone, quite apart from other important objections, such as great depth of water and narrow width of river between the high banks. The only other alternative Government project to that of the Philæ dam was a dam at Kalabsha, about thirty miles above Philæ; and here again, although the quality of the rock was all that could be desired, the depth and width of the river were such as to render the construction of the Government dam, as strengthened and otherwise modified by members of the Commission, absolutely impossible on financial grounds alone, apart from engineering difficulties.

Up to this point the British, French and Italian Commissioners, *it will be observed*, were in accord in rejecting the Government

projects; but here the divergence of opinion occurred. The French Commissioner continued his objections to the whole of the proposals, whilst the British and Italian Commissioners were unreservedly in accord with Mr. Garstin and Mr. Willcocks, and indeed with the whole of the Government engineers, in the opinion that the Philæ site offered all the advantages desired by an engineer for the construction of a dam at reasonable cost and of a stability which under every condition should be beyond all doubt. Nowhere else in the whole of the Nile Valley did they find such advantages of site: sound rock, numerous islands, a wide section, so that the action of the water issuing from the sluices would be minimised, and shallow water in which to work. As regards details of construction, the British and Italian Commissioners required certain modifications in the Government designs, with a view to give increased security, and these modifications were accepted by Mr. Willcocks without reserve as important improvements on the original designs—in the preparation of which, it is only fair to say, the Government engineers were hampered by certain instructions given to them to adopt the same type of construction for all the different sites, to facilitate the making of comparative estimates. The original plans having been published in several of the illustrated journals in this country, it may be well to state that, in the designs as now approved, the openings through the dam for the discharge of the Nile water, which in times of excessive flood may amount to the enormous quantity of 14,000 tons per second, have been very much reduced in size and correspondingly increased in number, so that the force of the issuing water may be more distributed; and further, that the whole of the openings will be lined with cast iron, one and a half inch thick, so that no stone can be torn out, or piece of masonry destroyed, by the constant impact of large volumes of water at high velocity. Again, the width of base of the dam has been increased, so that the pressure on the solid granite masonry will be less than that on any of the great dams in the world. The security of the dam has thus been doubled at an increased cost of about twenty-five per cent. on the original estimate of 1,600,000*l.*

The French Commissioner did not join in the detailed criticism of the construction of the Philæ dam, as he rejected this site at once on the sole ground of the presence of the temples, which unless removed or raised would be partially submerged for some months in the year. It is true that the question of the temples was expressly reserved for the Government, and not for the Commissioners, whose individual opinions on such a subject were of course not worth more than that of any other three men. However, it was satisfactory to the British and Italian Commissioners *to know* that any objections their French colleague had to their *proposals were not based* on engineering grounds, and as regards

the Egyptian Government previous experience with mixed commissions had warned them that a wholly unanimous report was not to be expected, so no disappointment was experienced. That there are two plausible sides to every engineering question is evidenced clearly enough by the proceedings in parliamentary committee-rooms; and under present political circumstances it would be as hopeless to expect an engineer representing one country in Egypt to be cordially in accord with engineers representing certain other countries, as it would be to find the engineers of two rival lines of railway promoting Bills in Parliament in accord. Nor is this any practical detriment to the elicitation of the truth, which was the primary object of the Egyptian Government in the appointment of the Commission, for the criticism of an able man opposed to a scheme would naturally be more searching in many points than that of a critic not so opposed, and any defect which might exist would be sure to see the light. The Government project for a dam at Philæ, as amended by the British and Italian Commissioners, having been subjected to such criticism and proved absolutely unassailable both on engineering and financial grounds, the aim of the Government in the appointment of the Commission was therefore completely attained.

The outcome of the Commission, briefly summarised, is that the whole of the Commissioners are unanimous in recommending the construction of a reservoir in the Nile Valley, and the majority of the Commission are absolutely convinced that it is practically impossible to place the dam elsewhere than at Philæ. The French Commissioner claimed that 'impossible' was an unknown word to French engineers; but the British Commissioner thought it was often a very useful word in relation to practical problems, and he had indeed used it himself with good effect some years ago when reporting to a group of financiers on the Panama Ship Canal. The French Commissioner thought that the engineers and contractors throughout Europe should be invited to study the Nile reservoir question and send in competitive designs, but the majority of the Commission were satisfied that this would only be useful if delay were the object, as the question had been exhaustively investigated by the Government engineers for four years, and the members of the Commission themselves were unable to suggest any reasonable alternative after going over the whole of the ground. The French Commissioner under reserve made certain suggestions as to alternative projects; but approximate estimates, prepared at the request of the majority of the Commission, showed that, even if practicable, the cost of the cheapest of these alternatives would be several millions greater than that of the Philæ dam, so that the projects were 'impossible' in the ordinary meaning of that useful word. Apart from cost, moreover, the type of dam proposed by the French Commissioner was such as neither the Government engineers nor the majority of the Commissioners

could accept. The latter maintained that if you ask people to live below a dam holding up 3,000 million tons of water to a height of eighty feet above their heads, you are bound to make the safety of the dam your first consideration, and, to attain that, the more your dam resembles a massive ridge of rock springing from the rocky bed of the river the better. The French Commissioner, on the other hand, proposed an open dam, or *barrage-mobile*, made up of isolated narrow piers with numerous sluices sixteen feet wide and up to eighty feet in height. In the opinion of the British Commissioner a slight tremor of earthquake, such as the Parthenon has recently experienced, the explosion of a boatload of powder dropped down the river by a few dervishes, or of a high explosive shell fired against one of the sluices or placed in position by an Anarchist, would suffice to destroy one of these huge sluices, and then the rush of the impounded waters would throw down each pier and sluice in succession and the country below would be devastated. These details are of interest only as illustrating the kind of difficulties which arise when an attempt is made to devise a dam at reasonable cost elsewhere than at Philæ. But it is hardly necessary to say that every patriotic Englishman would rather see the stones of Philæ temple broken up for concrete than allow Egypt to be involved in financial ruin either by embarking in an enormously costly scheme, or by building a structure of doubtful stability, so long as his countrymen have the leading voice in the management of Egyptian affairs.

Such being the facts of the case, and the whole of the responsible engineers of the Government and the majority of the Commissioners being in absolute accord on all points, what is the conclusion to which the average common-sense individual must inevitably ultimately be driven? It has been proved beyond dispute that the establishment of a reservoir in the valley of the Nile is a pressing necessity which will result in incalculable benefit to the country at large, and that at Philæ alone are found the conditions necessary for the building of an absolutely safe and reasonably cheap dam. The dam, therefore, must be built at Philæ, and with the least possible delay, or in the event of the occurrence of one or two 'bad Niles,' and the loss of several million pounds' worth of summer crops, Great Britain will be morally responsible for the loss and individual suffering. Lord Cromer, Sir Edwin Palmer, and others, representing Great Britain in Egypt, together with Nubar Pasha and his Ministry, can and will do the work in spite of all opposition, but the former will look for, and doubtless obtain, the encouragement and support of the Home Government and of every well-wisher of Egypt in this country.

As regards Philæ temples the matter stands thus: The Under-Secretary of State and the Commissioners have stated in no equivocal terms their appreciation of the importance of the question. The *British Commissioner* has personally examined the ruins, and is in

the possession of plans showing every detail. He is of opinion that the solidity of their construction, the absence of windows, and the solid rock foundation, render it far easier to raise these temples bodily than any of the buildings he has seen so dealt with in America. The well-drilled garrison at Assouan would be delighted to work the elevating screws with military precision, and no doubt can be entertained as to the success of the operation. When raised, the ruins surely must be of greater interest to any intellectual tourist than before. Half of the wonder and admiration excited by the monumental works of ancient Egypt arises from the magnitude of the masses handled and transported by the old Egyptians rather than from their artistic merit. It would be in accord, therefore, with the spirit of the surroundings if English engineers raised tens of thousands of tons where the Egyptians raised hundreds. From the archæological point of view the condition of the temples when raised would be unchanged, as every stone would remain as originally laid by the builders, and as shown on every drawing and photograph. From the artistic point of view the appearance would be enhanced, because the temples would rise out of a wide placid lake, whereas when now visited by tourists the Nile is low, the stream insignificant, and Philæ island appears to stand in a hollow. It is true that careful levelling would show that the floor of the temples stood some 380 feet above the Mediterranean, instead of 340 feet, and that fact may be fatal to the project in some minds. Whether, on being told that the temples had been raised bodily the visitor would exclaim 'How wonderful!' and examine the ruins with renewed interest, or whether he would say 'What Vandalism!' and return indignantly to his 'Cook's steamer,' would depend upon his individual temperament. However, if the temples are neither to be raised, removed, nor occasionally flooded, the only course will be to find some other site for a reservoir, and to induce the British Parliament to contribute the extra cost of three or four millions sterling, or to raise that amount by public subscription, for Egypt certainly will not find the money. Such being the present state of affairs, lovers of Philæ may do well, perhaps, to remember that under some circumstances 'silence is golden,' and that the present may be such an occasion. The cost of raising Philæ temples is included in the estimates submitted to Government, and possibly not too much curiosity will be evinced as to how the sum intended for compensation for property and buildings is made up. If, however, there should be a great deal of talk about Philæ, it is not improbable that the natives, who care not a piastre about the ruins, may suggest that those who do should find the 200,000*l.* required, and not the Egyptian taxpayers.

Hard words have been used in connection with Philæ, but it is to be hoped that with a better knowledge of the facts this will cease. To call an engineer a 'Vandal' because from the force of circumstances

he is compelled to interfere with an interesting ruin, is as silly and offensive as to style a man a 'snob' because from causes beyond control he is compelled to wear a shabby suit of clothes. Mr. Willcocks, the Director of Reservoirs, has personally inspected every yard of the Nile Valley, and tramped the adjoining deserts for hundreds of miles under circumstances often of great hardship, with the view to find, if possible, an alternative to the Philæ reservoir; and the labours of the other engineers of the Public Works Department in the same direction acquit them of all charge of Vandalism.

The conclusion to which most Englishmen will come after a careful consideration of the facts relating to Nile reservoirs and Philæ probably will be that the whole question may be safely left in the hands of their able and tried representatives in Egypt, whose successes in the past in the face of the most persistent opposition, and whose intimate knowledge of the requirements of Egypt, constitute them far better judges of the best policy to adopt than any individual or body of individuals in this country could be. The work will be an arduous one, but the representatives of Great Britain in Egypt are men of exceptional zeal and ability, who can be relied upon to bring any work they undertake to a satisfactory conclusion, whatever may be the personal sacrifices involved or opposition encountered.

BENJAMIN BAKER

THE SEVEN LORD ROSEBERIES
IN THIS NUMBER.

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of the English publishers.*

THE
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DID OMAR DESTROY THE ALEXANDRIAN LIBRARY?

To those unacquainted with the inner life of the Mohammedans, with the real spirit of the teachings of the latest of Prophets on earth, with the circumstances under which, and the state of society in which, Mohammed lived and laboured for the regeneration of his fellow-creatures, and with the esoteric significance of the precepts of the Sacred Book of nearly a fifth of the human race, in whose hearts is yet living the flame of religious zeal and faith, and whose every action and word can be traced to it, no enormity has appeared too improbable to be imputed to the Mussulmans. During the greater period of European history since the Crusaders, when the descendants of the Aryan and Semitic races were brought face to face in deadly strife, notwithstanding the characteristic qualities—strength of purpose, nobility of soul, bravery, and contempt of personal danger—displayed by Saladin, the Commander of the Faithful, even in the heat of religious feuds and disagreements, the European nations have persisted in depicting the followers of Islam as a barbarous and destructive people, the subverters of peace and order—in short, as monsters in human shape. This state of the public mind rendered it easy for the reception of the most unfounded stories and fictitious narratives, whose sole object appears to have been to blacken with a yet deeper dye the already gloomy picture of that unfortunate race.

The impression that generally prevailed in Europe against the Mohammedans only acquired colour and strength from the exaggerated reports of the Crusaders, many of whom returned from the Holy Land with stories of suffering and cruelty of the wildest description. It is a well-known fact that such is the avidity with which the human mind receives communications of the marvellous, and such the interest attached to those researches which describe any remote or extraordinary event, that the judgment of the traveller receives a bias, which induces him to fix upon that extreme point in his opinion which is calculated to afford the greatest surprise and interest. This characteristic of the human mind no doubt affords a competent solu-

tion. But a more important, not to say a stronger, argument is that the pilgrims who carried to their remotest homes these wonderful tales of their sufferings, and their one-sided impressions of the customs and manners of an alien people, were largely actuated by motives of religious hatred, intolerance, and superstition.

The historians of Europe of the times gave currency to such floating accounts in their works, and thus unconsciously stamped them with the seal of their authority. The writers themselves were zealous Christians, and considered themselves, with what sufficiency of grounds we need not pause to consider, smarting under a sense of personal injury at the hands of the 'unbelieving infidels' who followed the 'False Prophet'! It is not to be wondered at that they threw in their lot with vulgar opinion, and loudly proclaimed the imaginary shortcomings—nay, barbarities—of the 'turbaned' Saracenic hordes. The science of history had not come to be cultivated in any critical spirit. The genius of a Gibbon or a Buckle had not dawned. Calm dispassionate criticism was entirely unknown. As a consequence, we at the present day find that a mass of false allegations were at one time laid at the door of the Mussulman nation, for which that nation was not in the least degree responsible.

The subject of the present essay is of this class. We shall, in the course of the following pages, discuss the question fully with a view to find out what blame, if any, attaches to the Mohammedans for the destruction of the once famous Royal Alexandrian Library.

In discussing and arriving at a definite conclusion on this subject, it will be necessary to have recourse to the writings of historians of the East as well as of the West, who in their works have in any manner referred to it, and which are accepted as of any value at all. In this connection, and in assigning their respective values to the compositions of the West as against the East and *vice versa*, it will be necessary to premise a few introductory remarks.

It is admitted by the enlightened critics of this nineteenth century that the rudest people are entitled to respect in the annals of their own country, provided of course they do not contradict probability. When the writings of an Eastern nation coincide with those of European authors, history is strengthened; when they are silent, the silence naturally leads to inquiry and circumspection. But when the writings are opposed to each other, the question arises as to whom we are to believe. Are we to believe the natives, who might have had access to genuine records, or the enemies of their race and religion, who probably never could have had such access?

This question is not so difficult to decide when the Arabs of Eastern nations and the Christian monkish writers of Europe represent the parties. When we remember how few writers faithfully record the facts even of their own experience and observation; when we bear in mind the peculiar bent of humankind which causes

writers to record passing events concerning their country, their ideas, or their party, in a manner conducive to their best credit; when we bear in mind the necessity, which even the most enlightened and impartial minds the world has ever seen have found, of swimming with the tide of popular prejudice; when we often see that rational evidence and unvarnished truth are sacrificed to vanity, fiction, exaggeration, or the support of an individual theory; in short, when we consider such circumstances, it must candidly be confessed that we should pause before placing implicit belief in any particular class of historians to the exclusion of any other. In the darker ages of every community the materials available to the historian are but few indeed, and the place of facts is not unfrequently supplied by ideas evolved out of a strong and fertile imagination.

During the period with which we are here concerned the light of spiritual faith, accompanied by a revival of letters, had dawned on Arabia, while Europe was yet slumbering in the long intellectual night of the Dark Ages. For the first three centuries after the rise of Islam, it was a rule observed by all the Arab historians to quote the authority which they relied upon in mentioning any fact; and in cases in which they obtained their information second-hand or third-hand, &c., they used to mention the names of all the intermediate authorities. It was another rule with them to reject any authority whose writings may have been proved even in one single instance to be untrue. Thus history, as it was written by the Moslems in their early days, was very trustworthy.

With the greatest respect to the monkish historians of the Dark Ages of Europe, it cannot be denied that they have strung together masses of impracticable and untrue circumstances into the contiguous whole of history, indenting largely on their imagination for facts. The historians of the Middle Ages belonged to the clerical order. According to Buckle,¹ history, as habitually written by the highest European authorities, previous to its improvement in the seventeenth and eighteenth centuries, 'was little else than a tissue of the grossest errors.' The learned author proceeds to show 'that, during several centuries, Europe did not possess a single man who had critically studied the past, or who was even able to record with tolerable accuracy the events of his own time.'

Tracing the history of the origin of historical literature, Buckle (vol. i. p. 307) points out that

Shortly before the final dissolution of the Roman Empire, the literature of Europe fell into the hands of the clergy, who, taken as a body, have always looked on it as their duty to enforce belief rather than encourage inquiry. Hence literature during many ages, instead of benefiting society, injured it, by increasing credulity, and thus stopping the progress of knowledge. Indeed, the aptitude for falsehood became so great that there was nothing which men were unwilling to

¹ Vide *History of Civilisation in England*, i. 291.

believe. Nothing came amiss to their greedy and credulous ears. Histories of omens, prodigies, apparitions, strange portents, monstrous appearances in the heavens, the wildest and most incoherent absurdities, were repeated from mouth to mouth, and copied from book to book with as much care as if they were the choicest treasures of human wisdom.

As an instance of the absurd notion that prevailed in former days in Europe regarding Mohammed and his religion, we shall here relate a story, as given by Matthew Paris, the most eminent and learned historian, not only of his time, but of the Middle Ages, to explain why the 'Faithful' refuse to eat pork. 'It appears that Mohammed, having on one occasion gorged himself with food and drink till he was in a state of insensibility, fell asleep on a dunghill, and in this disgraceful condition was seen by a litter of pigs. The pigs attacked the fallen Prophet and suffocated him to death, for which reason his followers abominate pigs, and refuse to partake of their flesh.'

Some modern compilers of ancient history may be inclined to dispose of the whole range of the literature of the East as wild, uninteresting, and obscure. But, as an intelligent writer remarks, 'such a mode of indiscriminate censure can only tend to perpetuate error. Truth ought to be searched for wherever it can be found; and a well-authenticated fact, if told by a Persian, an Arab, or a Chinese, should remove an improbability, though adorned with all the eloquence of Greece or Rome.'

Alexander the Great, the son of Philip of Macedon, commemorated his conquest of Egypt in B.C. 332 and his capture of Tyre, which yielded only after a determined resistance, by building the city of Alexandria, at the mouth of the Nile, to which the commerce of which Tyre had till then been the centre was transferred as being the most convenient situation connecting the Eastern with the Western world. Though the conquests of Alexander were not of a permanent character, the unwieldy empire he had founded having fallen to pieces immediately after his death, the centres of Greek civilisation which he had planted in the shape of Greek colonies flourished for a long time after and left their mark in the history of the conquered countries. The province that profited most was Egypt, and, as a matter of course, Alexandria—the only one of the cities of that name founded by the great conqueror to mark his exploits—which rose to eminence, and became its capital. This city, as it was intended to be by its royal founder, soon became the centre of intellectual and literary life, as well as of commerce and industry. Geography and ethnology, and the practical sciences—mathematics, mechanics, and natural history (to promote the study of which sciences Alexander laboured hard, a predilection no doubt derived from the teachings of Aristotle, whose pupil he was)—flourished greatly.

In the scramble for territory that followed the death of the

Conqueror, one of his famous generals, Ptolemy, the son of Lagus, surnamed Soter, obtained possession of Egypt in B.C. 323. He developed Egypt into a great military and naval State. During his reign, Alexandria became the great centre for Greek civilisation and culture, both for the Eastern and the Western world. Like his royal master, Ptolemy also was the pupil of Aristotle, and the taste for learning which he displayed was no doubt imbibed from that great philosopher. His most celebrated institution was the Museum, which contained the Alexandrian Library, and residences for philosophers, poets, and scholars. Ptolemy's Museum, unlike its modern namesake, which is only a repository of curiosities, was a unique institution. It

was a portion of the king's palace, appropriated to men of learning, who were there maintained by the royal liberality, and provided with all the appliances for facilitating their studies. The vast libraries containing upwards of 700,000 volumes were close at hand. There was a botanical garden for the phytologists, a menagerie for the zoologists, a dissecting room for the anatomists. Here the astronomers were supplied with every instrument known to their science—armillary spheres, astrolabes, mural quadrants, dioptras. Here poets, grammarians, historians, astronomers, mathematicians, engineers, chemists, physicians, theologians, magicians, and astrologers dwelt under one roof and ate at one table. Sometimes the monarch himself would preside at their repasts. Verily these were golden days for men of learning. To Alexandria, as to a centre, were attracted the studios of every nation, of whom there were, it is said, at one time, no fewer than 14,000 gathered together.*

When Ptolemy abdicated in favour of his youngest son, Philadelphus, the latter continued to extend the same patronage to art and literature. The institution founded by his father, attained, under his unremitting care, the highest prosperity. Natural history in particular was studied with great ardour, and many scientific books were produced. His son and successor, the third Ptolemy, also was a great patron of letters, and added largely to the treasures of the Alexandrian Library. Thus it was in the reigns of the first three Ptolemies that Alexandria flourished as the centre of Greek civilisation and enlightenment, and the Royal Alexandrian Library was mostly collected. The later kings of Egypt of the same name were indolent and debauched in the extreme; in consequence of which, after numerous vicissitudes, Egypt became a Roman Province, about B.C. 30.

The obligations which the Alexandrian school of philosophers has laid the world under, in almost every branch of learning and science, are immense. This school produced some of the most eminent men, among whom may particularly be mentioned the following: Euclid, the mathematician (B.C. 323-283), Aristarchus of Samos, who, in the third century B.C., distinguished himself by his efforts to establish the Pythagorean doctrine of the earth's motion; Archimedes, the Syracusan mathematician; Hipparchus, the Newton of the Greeks

* *A Popular History of Science*, by R. Routledge, B.Sc., F.C.S.

(B.C. 160-125); and the great astronomer Ptolemy, who flourished about A.D. 150. The greatest service to modern science, however, rendered by this school is 'the adoption of a method of attacking the problems of nature, that thenceforth proved the true and faithful method of natural science . . . in which observation, experimental investigation, and a careful sifting of facts took the place of deductions from assumed principles and of theories based upon foregone conclusions or false analogies.'

It will thus be seen that a Royal Library did exist at the capital of Egypt; that it was established in the pre-Christian period of the idolatrous kings of Egypt; and that the library contained almost all the writings of the world then known, collected by Greek industry from various sources. The existence of the Library having been proved, it remains to find out when and by whom it was destroyed; and particularly whether it was the Mussulmans who, as is the general belief in Europe, destroyed it in their first outburst of religious enthusiasm, insatiable thirst for conquest, and blind iconoclasm.

Direct evidence on this point there is none. No historian—Christian, Pagan, Jew, or Moslem—who lived at the time of the Saracenic conquest of Alexandria (A.D. 642), or who was present at the capture of the city, or lived so near that period that he could have learnt from one who lived at the time or witnessed the event, has ever mentioned this subject.

The authorities relied upon by the historians of Europe in this controversy are four—Abulpharagius, the Armenian historian, and the three Arabic authors, Haji Khalifa, Makreezi, and Abdul Lateef of Bagdad. We shall proceed to a detailed and critical examination of the writings of these authors.

Abulpharagius was born in A.D. 1226 in Malatia (Asia Minor), and was early brought up in the tenets of the Jacobite faith, which his father, a Jewish physician, had embraced. He was appointed to the bishopric of Guba in his twenty-first year, in consideration of his extensive learning, knowledge in divinity, and linguistic attainments. Ultimately he became primate, a rank that is second only to that of patriarch. The most celebrated of his works is his *History of the Arabian Dynasties*, composed originally in the Syriac language, which displays great erudition coupled with extensive research. He also wrote an abstract of this history in the Arabic language, which was translated into Latin and first given to the European world by Dr. Pococke in 1664. The abstract differs in many points from the original *Dynasties*, one of them being that the destruction of the Alexandrian Library under orders from the Caliph Omar finds mention in the former. Gibbon wrote: 'Since the *Dynasties of Abulpharagius* were given to the world in Latin version, the tale has been repeatedly transcribed.' The celebrated historian adds: 'For my own part I am strongly tempted to deny both the fact and the consequences.'

Before entering into a discussion as to the weight to be attached to the testimony of Abulpharagius, we give below a literal translation of the passage bearing on this point from the Arabic abstract of Abulpharagius, called *Mokthasar-ud-Dawal* :—

And, at this time, John, who in our language is surnamed *Philoponus*, came to be known among the Arabs. He was a resident of Alexandria and a Jacobite Christian. He afterwards denied the Christian doctrine of the Trinity. Hereupon all the priests of Egypt joined together and requested him to relinquish his (heretical) belief. He did not listen to them. In consequence of which, he was degraded from his rank. He lived to an old age; so much so that when Amr Ibn-ul-A'as took Alexandria, he presented himself before Amr. As Amr had already heard of his abilities, he treated John with great respect, and listened to his philosophical discussions, such as were entirely unknown to the Arabs. These discussions created such a deep impression on Amr's heart that he became enamoured of him. Amr was a clever, intelligent, and discreet individual; and the society of John, therefore, became a necessity to him, and he never used to separate him from himself.

One day John said to Amr, 'You are master of every kind of thing in Alexandria. I do not wish to object to your remaining in possession of those things that may be useful to you; but we people are more entitled to such things as are not useful to you.' Amr asked him what he wanted; to which John replied, 'The books on philosophy that are in the Royal Libraries.' Amr said that he could give no order on the subject without obtaining the sanction of the Caliph Omar. Amr then informed the Caliph of John's request. The following reply was received: 'Regarding the books you refer to, if they are in accordance with the Book of God (Koran), then in the face of the existence of that book, there is no need for them; but if the subjects they treat of are contrary to the Book of God, then let them be destroyed.' Amr commenced to distribute them among the baths of Alexandria, and burn them. In short, it took them six months to be completely consumed. Thus, listen to what happened and wonder!

Abulpharagius was a high dignitary of the Christian Church, who flourished about the same time as Matthew Paris, whose story to explain why the Moslems refuse to eat of the flesh of the pig has already been related. In the next place, he wrote six hundred years after the capture of Alexandria, and was the first writer who gave currency to the story in the shape he is supposed to have done. We say, 'supposed to have done,' because we have no authentic information to show that Abulpharagius did mention the alleged circumstance. Its absence in the larger and fuller original work in Syriac is a point not to be lost sight of. This circumstance leads to the conjecture that the mention of the Alexandrian Library and its fate in the Arabic abstract *Mokthasar-ud-Dawal* is a spurious interpolation by some ingenious writer, who perhaps wanted to clothe a common tradition with the authority of the great historian. Even supposing that Abulpharagius himself gave insertion to the story in the Arabic abstract, it cannot be held to strengthen the truth of the incident. For, as is common in every age and in every clime, there are many traditional narratives which are handed down for centuries, from generation to generation, which are but the fabrications of ingenious

story-tellers⁴, who are guided by no higher motives than those of making them exciting and interesting by supplying a large number of exaggerated details. That there did exist, at one time, a vast collection of books in Alexandria, and that the library was destroyed, are, as we have already pointed out, historical facts. The Christian story-tellers might have innocently made capital out of these circumstances and invented a story to blacken the character of their enemies in race and religion. This story may thus have been a Christian invention, handed down for generations among the Christian inhabitants; and Abulpharagius, being a Christian Primate, may have mentioned it as such in his Arabic abstract. But, however this may be, it stands to reason that, under such suspicious circumstances, a stain of this magnitude cannot be allowed to attach itself to any nation on the uncorroborated testimony of an alien in religion who lived six hundred years after the alleged event in Asia Minor, and wrote of Alexandria in an age when religious bigotry always tortured events to the best advantage of its votaries. The probabilities of the story are also very great, as we shall point out in a future paragraph.

The next authority we shall consider is Haji Khalifa. His words, translated, are as follows:—

The Arabs, in the early days of Mohammedanism, did not turn their attention to any branch of knowledge except lexicography, revealed law, and medicine. Only this species of learning, on account of its general utility, was cultivated by a few. The reason for this was, as the principles of the faith of Islam and people's beliefs had not become firm and rooted, it was feared that they (the beliefs, &c.) might be shaken by (a cultivation of) the ancient sciences; so much so, that *it is said* that the said people, at the time of their capture of cities, destroyed the books which they found.

This general hearsay statement of Haji Khalifa about the destruction of books at the capture of cities, which is all that in the remotest degree has any reference to the question at issue, used to be construed into evidence in support of the accusation. But when Baron de Sacy pointed out the exact nature of Haji Khalifa's testimony, it was put forward as corroborative evidence. Evidence in order to be corroborative must be direct. Not only is there not the slightest reference to the Alexandrian Library, or, for the matter of that, any library in Egypt, but even the general allegation is prefaced by the introductory phrase '*it is said*,' which removes all responsibility from the writer. This evidence is therefore entirely valueless against the Mussulmans.

⁴ The following instance is quoted from Gibbon: 'The Christians, rashly enough, have ascribed to Mohammed a tame pigeon that seemed to descend from heaven and whisper in his ear. As this pretended miracle was brought forward by Grotius (*De veritate religionis Christianae*), his Arab translator, the learned Pococke, inquired of him the names of his authors, and Grotius was obliged to confess that it was unknown to the Mohammedans themselves. Lest, however, it should provoke their indignation and ridicule, the *pious lie* was suppressed in the Arabic version, but still maintains a conspicuous place in the numerous editions of the Latin text.'

Next we shall give a true translation of Abdul Lateef's passage, which has been transcribed in his book by Makreezi, who, however, has no independent evidence to offer. It is therefore unnecessary to say anything further of Makreezi. Abdul Lateef, in his history, has a chapter on *The Minaret of Savari*, in which, after describing the minaret around which are said to have existed 400 smaller columns, he adds: 'And it is said that this is one of those columns which supported the roof of the portico of Aristotle, wherefrom Aristotle taught medicine, that in it was located an Academy, as also the Library which Amr Ibn-ul-A'as burnt under the orders of the Caliph Omar.'

Abdul Lateef lived five hundred years after the conquest of Egypt. He was not so much of an historian himself as a compiler. He compiled his history from the earlier works of the earlier writers. If he were indebted to any historian for this description, he would have referred to his authority. That no Arab author before the time of Abdul Lateef mentions the destruction of the Alexandrian Library is convincing proof, not only of the baseless nature of the allegation, but of the fact that Abdul Lateef had no valid authority—indeed, no written authority of any historian, contemporary or subsequent—for making the statement. Nor does Abdul Lateef appear ignorant of this circumstance. The very style in which he has expressed it shows that he only casually mentions a hearsay tradition, to which neither does he attach any importance himself nor expect his readers to attach any.

All the circumstances contained in the above extract are untrue; and this strengthens our opinion that Abdul Lateef gave no credence to it, but, in the manner of historians when inserting popular beliefs and stories, he has prefaced his statement by the irresponsible 'it is said.'

The absence of any mention of this important event in any contemporary work, or in any work for near five centuries after its alleged occurrence, is a strong argument against its truth. If the Library were so vast at the time of the Saracenic conquest as historians have made it appear, and had the Caliph ordered its destruction on the grounds imputed to him, it was only natural that the Moslem historians who have sung the praises of this great conqueror should have made capital out of it, and extolled, with Oriental exaggeration, the Caliph's order as having proceeded from a devout follower of the Prophet, who had once compared Omar to Noah,⁵ and have gloried

⁵ Sale, in his *Alcoran*, p. 146, note, thus wrote: 'Among the seventy prisoners whom the Moslems took in this battle (Bedr) were al Abbās, one of Mohammed's uncles, and Okail, the son of Abu Taleb, and brother of Ali; when they were brought before Mohammed, he asking the advice of his companions what should be done with them, Abu Becr was for releasing them on their paying ransom, saying that they were near relations to the Prophet, and God might possibly forgive them on their repentance; but Omar was for striking off their heads, as professed patrons of

in it. But there is no mention of it whatever in any book on any subject that was composed in any language for five hundred years afterwards.

Before proceeding further, we shall have to consider what position in the world the Arabs occupied from the seventh to the tenth century after Christ, in order to understand clearly the value that should be attached to this negative evidence.

That Mohammed had enjoined religious toleration, especially with regard to the Christians, is evident from a curious document, the authenticity of which may be considered sufficiently guaranteed by the high reputation for piety, integrity, and learning, enjoyed by Richard Pococke, Bishop of Meath, who quotes it in his book called *A Description of the East and other Countries*, vol. i. p. 268, ed. 1743. The document is entitled: 'The patent of Mohammed, which he granted to the monks of Mount Sinai, and to Christians in general.' It is dated the third day of Moharrum, in the second year of the Hegira, and is a promise of toleration and protection to the Christians, to hold good 'until the end of the world'; and further plainly points out that anyone who acts contrary to it 'becomes truly an apostate from God and His Divine apostle.' The document is based upon the express word of God that says: 'Do not molest those who have a veneration for the books that are sent from God; but rather, in a kind manner, give of your good things to them, and converse with them, and hinder everyone from molesting them.' This spirit is evident in the action of the Caliph Omar, who, after his capture of the city of Jerusalem in A.D. 637 (five years before the conquest of Alexandria), made his triumphal entry into the town in the company of the Patriarch Sophronius, conversing with him on the antiquities of that city.

To further prove that toleration was inculcated by their Prophet and practised extensively by his followers, we shall make two extracts.

A Christian writer in *Chambers's Encyclopædia* says: 'One

infidelity. Mohammed did not approve of the latter advice, but observed that Abu Becr resembled Abraham, who interceded for offenders, and that Omar was like Noah, who prayed for the utter extirpation of the wicked antediluvians; and therefore it was agreed to accept a ransom for them and their fellow-captives—soon after which, Omar, going to the Prophet's tent, found him and Abu Becr weeping, and asking them the reason of their tears, Mohammed acquainted him that this verse (Unless a revelation had been previously delivered from God, verily severe punishment had been inflicted on you, for the ransom which ye took from the captives at Bedr) had been revealed condemning their ill-timed lenity towards their prisoners, and that they had narrowly escaped the Divine vengeance for it, adding that if God had not passed the matter over, they had certainly been destroyed to a man, excepting only Omar and Saad Ebn Moadh, a person of as great severity, and who was also for putting the prisoners to death. Yet did not this crime go absolutely unpunished neither; for in the battle of Ohod the Moslems lost seventy men, equal to the number of prisoners taken at Bedr, which was so ordered by God as a retaliation or atonement for the same.'

remarkable feature of the Moslem rule in Spain deserves mention, as it contrasts them so favourably with the contemporary and subsequent rulers of that country—and that is their universal toleration in religious matters.'

Godfrey Higgins wrote :—

Nothing is so common as to hear the Christian priests abuse the religion of Mohammed for its bigotry and intolerance. Wonderful assurance and hypocrisy! Who was it that expelled the Moriscos from Spain because they would not turn Christians? Who was it that murdered the millions of Mexico and Peru and gave them all away as slaves, because they were not Christians? What a contrast have the Mohammedans exhibited in Greece! For many centuries the Christians have been permitted to live in the peaceable possession of their properties, their religion, their priests, bishops, patriarchs, and churches; and the war between the Greeks and Turks was no more waged on account of religion than was the war between the negroes of Demerara and the English.

The latest instance of Christian intolerance is the persecution of the Jews in Russia at the present day. What a different treatment they received under the Moslems, when, during their rule in Spain, we read of learned Jews occupying high positions at the head of the great Moorish schools and universities!

If the Mussulmans had destroyed the Alexandrian Library, they can only be supposed to have done so from a spirit of religious intolerance. But after the patent above referred to, how could they have destroyed the property of the Christians?—for such the Library must have become when the Christians became the rulers of the country. This raises the presumption that at the time of the Mussulman invasion of Egypt the Library had been shorn of its grandeur, even supposing that a wreck of it did exist. This question we shall discuss further on.

History teaches us that the Arabs had a true aptitude for science, literature, and philosophy, for these found a home with that nation when Europe was steeped in ignorance and barbarism. Three Caliphs, who ruled at Bagdad from the middle of the eighth to the middle of the ninth century of the Christian era, deserve special mention in this connection. They are Jaafer al Mansur, Haroun ar Raschid, and Mamoun ar Raschid. These three Caliphs were great patrons of learning; and, as examples of their spirit, may be related the facts that in the time of Mansur the services of a Christian physician were engaged to instruct his people in the healing art; that Haroun decreed that a school should be attached to every mosque throughout his vast dominions, and placed the schools under the superintendence of John Masue, a Nestorian Christian—facts which go to prove that these Arabs looked upon a man's intellectual fitness, and not his religious principles, as constituting the criterion of his ability to perform the duties entrusted to him. The reign of Mamoun (A.D. 813-833) is regarded as the Augustan age of Arabic learning. In

his time, his capital, Bagdad, became the recognised seat of learning. Hundreds of ripe scholars, and students eager to learn, flocked to his capital from all parts and nationalities, as they did twelve centuries ago to Alexandria. The Caliph sent out his emissaries to all parts of the then known world to collect ancient manuscripts to his library, and it was not an unusual sight to see, in his days, trains of camels entering Bagdad laden with the literary treasures his emissaries had succeeded in hunting up from the four corners of the world. One of the stipulations of a treaty which Mamoun concluded with Michael the Third, the Greek Emperor, was that one of the libraries of Constantinople was to be given up to him.

Nor were there wanting signs of alarm expressed by orthodox theologians at this indiscriminate patronage of ancient learning. 'It is recorded that a Doctor of Divinity of the period took upon himself to denounce such studies, asserting that the Caliph would assuredly draw down upon himself the vengeance of Heaven for daring to permit the diffusion among the faithful of philosophies and sciences which might unsettle their beliefs.' But the protest fell upon deaf ears. The Caliph not only ordered a measurement of the spherical earth to be made, but caused an Arabic translation to be prepared of Ptolemy's great work on Astronomy. This was completed in 827, the translation being called *Almagest*.

Thus it will be seen that we moderns are greatly indebted to the Arabs for preserving and handing down to us, together with their own researches,⁶ the ancient sciences and learning during a period of some centuries, when Europe was sunk in ignorance, so much so that even kings could not sign their names, and priests could hardly read.⁷ It will also be evident that the Arabs were not such an ignorant or

* Improved preparation of gunpowder; cultivation of silk; weaving of silk; fabrication of finely tempered weapons, as in the famous Toledo blades; preparation of the best kind of leather, still called Morocco and Cordovan; training of the horse, so that the world obtained a variety of that noble animal possessing the highest development of its finest qualities; use of the mariner's compass—these are but a few of the advances in the arts of civilised life which we owe to the Arabs. We must not omit to mention another invention of theirs which has in no slight degree contributed to the diffusion of learning, and that is paper made of fine linen, to take the place of the far more costly parchment.

⁷ Draper, in his *History of the Intellectual Development of Europe*, wrote: 'A man might walk through Cordova in a straight line for ten miles by the light of the public lamps; 700 years after this there was not so much as one public lamp in London. The streets of Cordova were solidly paved: in Paris, centuries afterwards, whoever stepped over his threshold on a rainy day, stepped up to the ankles in mud.' Compare the beautiful residences of the Moorish princes of Granada, and the Alhambra Court, with 'the dwellings of contemporary monarchs of France, Germany, and England, which are described as mere hovels, without windows or chimneys, and with mere holes in the roofs for the smoke to escape.'

Everywhere in the extensive dominions of the Arabs, universities, colleges, and schools had been established. Spain alone boasted of seventy public libraries. The Royal Library of Spain contained 600,000 volumes. The library at Cairo contained an immense number of books. Cairo was also the seat of a great medical school.

illiterate race as to allow such a splendid opportunity to pass unheeded, of recording one of the *grandest* achievements of iconoclasm the world has ever witnessed (that is to say, supposing the Alexandrian occurrence had its foundation in truth) as a monument for their future glorification.

Next let us turn our attention to the question of probabilities. Even here we find ourselves confronted by numerous obstacles in the way of giving credence to ~~this~~ tradition. As pointed out by historians, this Library during the greater part of seven centuries sustained great damages from fire, war, plunder, and theological bigotry. We shall mention one instance of popular commotion. In the commencement of the fifth century A.D., bitter disputes and deadly feuds existed among the three principal classes that composed the population of that city—Christians, Jews, and Pagans. In A.D. 415 lived the famous Hypatia, a female cultivator of mathematics and astronomy. She was murdered by the Christians at the instigation of their fanatical leader Cyril. This marks the last stage of the Alexandrian school. And yet this was fully two centuries before the Moslems took that city.

Draper, in his *History of the Conflict between Religion and Science* (p. 103), in referring to Abulpharagius's description of the destruction of the Alexandrian Library, wrote:—

But it must not be supposed that the books which John the labour-lover (Philoponus) coveted were those which constituted the Great Library of the Ptolemies, and that of Eumenes, King of Pergamus. Nearly a thousand years had elapsed since Philadelphus began his collection. Julius Cæsar had burnt more than half; the Patriarchs of Alexandria had not only permitted, but superintended the dispersion of almost all the rest. Orosius expressly states that he saw the empty cases or shelves of the Library twenty years after Theophilus, the uncle of St. Cyril, had procured from the Emperor Theodosius a rescript for its destruction. Even had this noble collection never endured such acts of violence, the mere wear and tear, and perhaps I may add the pilfering of a thousand years, would have diminished it sadly. Though John, as the surname he received indicates, might rejoice in a superfluity of occupation, we may be certain that the care of a library of half a million books would transcend even his well-tried powers; and the cost of preserving and supporting it, that had demanded the ample resources of the Ptolemies and the Cæsars, was beyond the means of a grammarian. Nor is the time required for its combustion or destruction any indication of the extent of the collection. Of all articles of fuel parchment is, perhaps, the most wretched. Paper and papyrus do excellently well as kindling materials, but we may be sure that the bathmen of Alexandria did not resort to parchment so long as they could find anything else, and of parchment a very large portion of these books was composed.

Allotting one volume *per diem* to each of the four thousand baths of Alexandria, we find that the number of volumes, to last for six months, must have been 728,000! This represents, however, the number that existed in the palmiest days of the Ptolemies. But history proves that this vast collection suffered incalculable damage for

centuries. How, then, are we to believe that there was even a remnant of the Library when Amr took Alexandria?

We must also bear in mind that at the time of the Saracenic conquest Alexandria was the second city, in matter of importance, in Christendom. We read that the Saracenic siege lasted for near fourteen months before it was taken. During this period Heraclius, the Byzantine Emperor, helped the beleaguered city by sending reinforcement and provisions from the sea side, which was open to his fleet. Many of the richer citizens also escaped from the city, by sea, with all the worldly effects that they could carry, when they found that their chances of holding out much longer against Saracenic odds were feeble indeed. The emperor could easily have caused the treasures of the Library to be transferred to Constantinople; and probably he did so. Or more probably the books might have been removed two centuries before, when Theodosius the Second established his library in Constantinople; particularly as the majority of that collection was composed of books from Egypt and Asia Minor.

Draper, however, is of opinion that 'there can be little doubt that Omar gave this order;' and in support of this states that 'the Khalif was an illiterate man; his environment was an environment of fanaticism and ignorance.'

That Omar gave such an order is highly improbable. In the first place, the existence of even a wreck of the Alexandrian Library has not been proved. Next we have to bear in mind the patent of protection, granted by the Prophet to the Christians in general. We read of treaties concluded by Jesuiabbaa, the Pontiff of the Nestorians, with the Prophet and the Caliph Omar. We have seen that Omar made his triumphal entry into Jerusalem, on its capture in 637, discoursing with the Patriarch Sophronius on the antiquities of that city; which further shows that Omar was not illiterate.* It was Omar who first appointed the Hegira, which dates from the 16th of July, A.D. 622. Amr, the general who took Alexandria, was, according to Abulpharagius's own showing, an intelligent and shrewd individual, who delighted in the company of Philoponus. When we remember that Amr had unbounded influence over the Caliph—for it was on his own initiative that he undertook the conquest of Egypt, against the inclination of Omar—it is easy to see that Amr could, and would cer-

* The following story of Omar's conversion to Islam further proves that he was not illiterate. It must be remembered that Omar was, before his conversion, one of the most uncompromising, but most generous of the Prophet's enemies. 'Omar had been highly displeased with his sister Ameina for having embraced the new faith, so that finding her one day reading the Koran aloud, he struck her violently, dashing, at the same time, the book on the ground. The maiden, calm and collected, picked up the volume, but still persisted in refusing to give it to her brother, who, now still more exasperated, snatched it from her; but, his eye glancing involuntarily over some of its lines, he was seized with wonder and, conviction succeeding to admiration, he became a Mussulman on the spot.'—Davenport's *Apology for Mohammed and the Koran*, pp. 21–22.

tainly have pleaded for the preservation of the Library, had it existed. Again, if the Library had really been destroyed by the Moslems, the books of John, the labour-lover, would have been the first to perish; but all his works are extant, and Arabic translations of them exist. None of the biographers of Philoponus, who have studied and admired his productions, mention this incident. Nor can it be urged that Philoponus rewrote his works after the destruction of the Library; for John was already an old man at the time of the Saracenic conquest, and, during the short term of life he enjoyed since, it is impossible that he could have recomposed his numerous and voluminous works—the production of a long lifetime.

The period of the Caliph Omar was not one of ignorance, as will be evident from the following extract. The Prophet and the first four Caliphs belonged to the *Koreish* tribe of the Arabians.

The *Koreish* tribe were the noblest and most learned of all the Western Arabs; they were also the greatest merchants, and carried on an extensive commerce with every adjacent State; whilst the *Kaaba*, or Square Temple of Mecca, which before the era of Mohammed was solely under their guardianship, drew annually a great concourse of pilgrims from every Arabian tribe and every country where the Sabian religion prevailed. Where many strangers are accustomed to assemble at stated times, politeness and refinement are a natural consequence. Numbers of the pilgrims were people of the first rank, and possessed of all the science peculiar to their country or their age. Great fairs were held during their residence, and a variety of gay amusements filled up the intervals of their religious duties. Of those entertainments, literary compositions held the most distinguished rank; every man of genius considering not his own reputation alone, but even that of his nation or his tribe as interested in his success. Poetry and rhetoric were chiefly cultivated and admired; the first being looked upon as highly ornamental, and the other as a necessary accomplishment in the education of every leading man. An assembly at a place called *Ocadh* had been, in consequence, established about the end of the sixth century, where all were admitted to a rivalry of genius. The merits of their respective productions were impartially determined by the assembly at large; and the most approved of their poems written on silk, in characters of gold, were, with much solemnity, suspended in the temple, as the highest mark of honour which could be conferred on literary men. These poems were called *Moallakat* (suspended) or *Mosahebat* (golden). Seven of them are in many European libraries, being the compositions of *Amralkeis*, *Tarafa*, *Zoheir*, *Lebid*, *Antara*, *Amru*,⁹ and *Hareth*.¹⁰

Omar was no fanatic; nor was his period one of fanaticism. The light of religious enthusiasm which the Prophet had kindled burnt on with undimmed brightness during the period of the first four Caliphs. Gibbon wrote: "The wars of the Mohammedans were sanctified by the Prophet; but, among the various precepts and examples of his life, the Caliphs selected the lessons of toleration" that might tend to disarm the resistance of the unbelieving.

⁹ The Saracenic general who took Alexandria, and who is supposed to have destroyed the Library under orders from the Caliph Omar. The name is written in Arabic with a *v*, which is silent. It is pronounced *Amr*.

¹⁰ John Richardson's *Dissertation on Eastern Nations*, prefixed to his Persian, Arabic, and English Dictionary (1806), vol. i. pp. ii. and iii.

¹¹ The italics are ours.

Omar undoubtedly was a man imbued with a strong sense of what was due to God and his apostle. He was a very severe man. But when the idolaters and polytheists had been extirpated from Arabia—'the temple and patrimony of the God of Mohammed'—the intolerant zeal of the Moslems was converted into the steady and wise policy of allowing the conquered nations to retain their freedom of conscience and religious worship, on payment of tribute. This is what happened in the case of Alexandria. That city had resisted the attempts of the Saracenic besiegers for near fourteen months. Numerous assaults and sallies were made, in one of which Amr, the general of the Moslems, himself was taken prisoner, but he subsequently managed to escape. Twenty-three thousand Saracens were slain. Under such circumstances, it might naturally be expected that the city, immediately after its capture, would be given up to plunder and massacre, had the Saracens been what they are depicted to have been, viz. an intolerant and fanatical people. But no such thing was done. The Saracenic general, in reporting his exploits to the Caliph, gave a glowing account of 'its four thousand palaces, four thousand baths, four hundred theatres, twelve thousand shops for the sale of vegetable food, and forty thousand tributary Jews.' The Caliph ordered that, in addition to a tax of two dinars per head of the population and the usual land tax, a special tribute should be levied, and that the lives and properties of the citizens should be protected. This arrangement by no means savours of fanaticism.

From the foregoing it must be evident to the impartial observer that no blame can possibly attach itself to the Mussulmans over the alleged Alexandrian incident. We would, however, request those who will, notwithstanding, persist in their erroneous belief to practise a little more of that Christian charity which they profess. Then we shall request to read what Godfrey Higgins says—'In all the history of the Caliphs there cannot be shown anything half so infamous as the Inquisition.' Then we shall pray to compare the almost bloodless capture of Jerusalem by the Moslems with its subsequent capture by the Christian Crusaders, whose list of atrocities is thus summed up: 'The brains of young children were dashed against the walls; infants were thrown over the battlements; every woman that could be seized was violated; men were roasted on fires; some men were ripped open to see if they had swallowed gold; the Jews were driven into their synagogue and there burnt; about 70,000 people, men, women, and children, were cruelly butchered.'

The words of M. Jurien are very pregnant: 'The Mahometans, according to the principles of their faith, are required to employ violence to destroy other religions; ¹² and yet they tolerate them now,

¹² This, however, is not true. As Gibbon wrote: 'The disciples of Abraham, of Moses, and of Jesus were solemnly invited to accept the more perfect revelation of Mohammed; but, if they preferred the payment of a moderate tribute, they were

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THE PROPOSED NILE RESERVOIR

I

THE DEVASTATION OF NUBIA

IN an article which appeared in the last (May) number of this Review, Sir Benjamin Baker, a distinguished engineer, has done his best to vindicate the proposed scheme of turning Lower Nubia into a reservoir for the benefit of Middle and Lower Egypt. He discreetly confines his estimate of the damage which the execution of this plan will cause to the loss of the temples and inscriptions at Philæ, and most of his adversaries have been content to confine their opposition to the same ground.

But, as Sir Benjamin Baker and his friends say, they court 'the fullest and most unbiassed discussion,' it is well to insist that the loss to archæology and the violation to sentiment caused by the submerging of Philæ are not the only elements in the question, as was stated last month in the adjoining article—the whole of Lower Nubia will be put under water. The flourishing little town of Shelal, containing perhaps 1,000 people, with their houses, stores, farms, palm trees, &c., must be sacrificed; so must all the dwellings and little farms on both sides of the Nile for fifty miles at least, and perhaps as far as the turn of the river at Korosko.

There is not one word in Sir Benjamin Baker's article about the ruthless expatriation of the inhabitants of all this district. And for what purpose? For the enriching of the population of another province! What is to be done with all these poor Nubians? They cannot be driven up into the desert, nor is it shown where any new land can be found for them; if they are to be quartered on the inhabitants of Middle or Lower Egypt, the discontent of both exiles and hosts will go far to counterbalance the advantages of a larger water supply. Moreover, with submerging of houses and farms will follow the ruin of many other temples, upon which the article in question is silent. What about Debot, Dakkeh, Kalabsheh, Gartass, Tehfa, Dendur, at all of which are picturesque historic ruins, not thoroughly explored, and inscriptions not yet adequately copied? In the same country there are, doubtless, many inscribed stones, and in the tombs of Coptics

Christians many papyrus rolls of the greatest value, yet to be discovered. All this area, so precious to archæology, is to be sunk under the water. The material mischief, however, both actual and prospective, will be enormous quite apart from questions of sentiment. A considerable number of harmless people are to be turned out of their homes, without any provision being proposed for their support, not to say any consideration taken of their feelings.

And for what? Our author tells us (p. 866) that

As to the *absolute necessity* for the construction of a reservoir with the least possible delay no shadow of doubt was expressed by any member of the Commission.

Fortunately, he goes on to explain this absolute necessity. Will the reader believe that it amounts simply to this: an *estimated* gain to the State of 750,000*l.* yearly, and of ten times that amount to the cultivators of Lower Egypt? It is not pretended that this population is in want: it is not true that there is any want in Egypt; the people never were so prosperous since Ptolemaic times: the *absolute necessity* of the engineers is simply the stand-point of greed on the part of the State, perhaps of certain bondholders, doubtless of the farmers in Lower Egypt, of whom Sir Benjamin Baker naïvely tells us (p. 866), that after the perfecting of the Barrage near Cairo, and the consequent enormous increase of water supply during the last few years—'Notwithstanding this, the demand for water by the cultivators is as great as ever, and no means exist for *satisfying their wants*' by storing up more water, &c. If the State did not sell water, and so increase its revenues, such a statement might pass for mere philanthropy; as it does, we may here again translate Sir Benjamin Baker's curious English into its proper equivalent: 'No convenient means exist for making more legitimate taxes out of the people,' or of satisfying their unlimited demands.

If he complains that we will not take his words in their natural acceptance, we reply that in the present case we deny that any want exists in Egypt, and in any case we are only applying the lesson he himself teaches us concerning his use of the English language. Commenting upon the statement (p. 869) that the majority of the Commissioners are absolutely convinced that it is practically impossible to place the dam elsewhere than at Philæ, and upon the very just criticism of the French Commissioner, that the word *impossible* was absurd, he says:

that the British Commissioner [*i.e.* he himself] thought it was often a *very useful word* in relation to practical problems, and he had indeed used it with good effect when reporting some years ago to a group of financiers on the Panama Ship Canal.

One hardly knows whether to thank him for the honesty of this statement, or for the reverse; at all events, we now know that whenever he uses the word *impossible*, it may be merely because it is

useful, especially in making a report to people whom he cannot easily persuade by argument.

In the present case, Sir Benjamin Baker's impossibility corresponds very well to his necessity. The scheme he advocates is necessary because he is convinced of its soundness; the scheme he opposes is impossible because he is opposed to it. But, however useful he may have found this use of terms when dealing with a group of financiers, he will find it the reverse when dealing with people who understand ordinary logic and ordinary English. It makes us slow to accept his facts, and very suspicious of his arguments. It leads us never to take on trust his necessities and impossibilities, but to sift every one of his statements. Perhaps even more significant than these are his silences. He never tells us that one of the schemes is to make a reservoir a little above Philæ, thus saving at least that precious island. He will not contemplate the feasibility of making several small reservoirs, thus obviating the risk of one great dam, where an accident might entail a devastation of all the country. He will not tell us definitely the objections to the Wady Rayan scheme, but puts us off with vague generalities.

Why, then, is he so positive that one scheme, and one only, is practically possible? Simply because he is convinced that it will cost less, and so much less that any other plan must be considered extravagant, and a mere expensive luxury to be paid for by any sentimental objectors on the ground of archæology. Now, in the first place, we cannot be sure that he has correctly estimated the cost of the dam at Philæ. He has said nothing about the indemnity required for the homeless Nubians; he has said nothing about the yearly loss to Upper Egypt and Nubia from the disappearance of tourists. Mr. Cook could doubtless tell us how many thousands sterling are involved in this latter item. Probably the loss would not be less than one million when capitalised. Although, therefore, Mr. Willcocks's scheme is called the cheapest, it may possibly be the dearest, even in actual outlay of cash. But even on Sir Benjamin Baker's statement, even if the dam below Philæ be the cheapest plan, let us count the cost of its cheapness. If the gain to Lower Egypt is indeed, according to his figures, to be nearly 10,000,000*l.* per annum, would it not be quite reasonable for the country to pay a single half-year of this profit to save its temples, and to avoid disturbing the Nubian population? If these poor people are as fond of their homes as other nations, the hardship of having these homes put under water to make people 500 miles off richer is surely a grave objection. If 5,000,000*l.* would avoid this cruelty and save the sentimental primacy of Egypt, is it reasonable to say that Egypt must not pay it, and we must subscribe to support our fads? To say that the natives do not care about such things and therefore would not pay for them, is only to put them on a level with the engineers who can see no

value in antiquities except as vast masses of stone to be hoisted into the air as a display of modern science (p. 871). Among intelligent and civilised people, the answer could hardly be doubtful. As Sir Benjamin Baker uses an illustration from imaginary English circumstances, so shall I. Supposing the water supply of London, though sufficient, was such that people were ready to pay for twice as much water, and so the engineers declared (in the interests of their profession or of a company) that a great new reservoir was 'absolutely necessary,' and one plan was to dam up the Thames, so as to submerge all its valley as far up as Oxford, including Magdalen College, which lies close to the river—supposing an alternative were proposed, which could be carried out at the increased cost of six months income of the expected profit, and which would save all the valley with its villages, its churches, and Magdalen College, would anyone in the nation, except an engineer who loved a dam more than a mediæval college, hesitate? We argue, then, that the Kalabsheh dam, or the Wady Rayan scheme, even if costing five millions more than the other alternative, would be for the best, and in the highest sense the cheapest, for the country. But Sir Benjamin Baker leads us to believe, by his use of the word *impossible*, that the difference in cost is out of all proportion. Now, will the reader consider the following figures, copied for me by a friend from Mr. Willcocks's report. They are the estimated cost of all the alternatives.

If the dam were constructed at Silsileh	1,650,000 <i>l</i> .
Below Philæ	1,400,000 <i>l</i> .
Just above Philæ	1,750,000 <i>l</i> .
Kalabsheh (50 miles above Philæ)	1,600,000 <i>l</i> .

The difference of cost is therefore not worth mentioning. What, then, can have possessed Sir Benjamin Baker to call ¹¹ the schemes but his own impossible?

For instance, the Kalabsheh scheme, which Mr. Willcocks reports as estimated at 1,600,000*l*., is declared (p. 867) 'absolutely impossible on financial grounds alone' as against the scheme which the same authority estimates at 1,400,000*l*. Surely here his fancies have completely overridden his facts. Doubtless, an engineer has sentiment, though of a very peculiar sort. There must be engineering beauties or difficulties in one scheme, as compared with another of nearly the same cost, which make him declare the one perfect and the other abominable. Sir Benjamin Baker and his Commission must have fancies like these, which they cannot justify by their own figures. *Naturam expellas furca, tamen usque recurret*. But is the technical sentimentality of the engineer to override the archæological and artistic sentiments of the mass of cultivated men?

Still worse is the greed of the financier, or his longing to show an increased surplus in the Egyptian revenue, which overrides all other views of the well-being and civilisation of the country. Is it

certain that the people would be happy if the shadoof and sakya were abolished, and water sold to them at their doors by a native official? Is it certain that the water of the Nile, cleared of its deposit by standing in huge reservoirs, will not lose a large part of its fertilising qualities? Are not great experts, like Colonel Ross, opposed to the scheme?

If a clear and unbiassed discussion were indeed desired, such points should be fully and carefully argued. But our author, whose abilities certainly do not appear in the field of controversy, 'lets the cat out of the bag' for us on this point also.

Lord Cromer (he tells us, p. 870), Sir Edwin Palmer, and others, &c., *can and will do the work, in spite of all opposition*, but will look for, and doubtless obtain, the encouragement and support of the Home Government and of every well-wisher of Egypt in this country.

This can only be described as the language of a set of bullies who have determined upon an act of tyranny, yet are afraid of public criticism. They know perfectly well that almost every well-wisher of Egypt in this country is against them. The Home Government will probably regard the question simply from its political side, and will be otherwise indifferent. Only the sordid interests of speculators, of greedy financiers, the hopes of contractors, and the curiosity of constructors may be with them; they will never gain over enlightened public opinion. They may dam up the Nile, but they will not dam up public indignation; they may submerge the most beautiful and historic island in the world, but they will not choke the love of the beautiful in the hearts of civilised men—a treasure which no dams can satisfy. They may pretend that they will hoist into the air acres of temples, a scheme perhaps as visionary as many other more reasonable engineering schemes; they will succeed in hoisting themselves into a pillory of public and lasting obloquy.

The claims of the valley of the Nile upon the sympathies of the civilised world, and its importance as compared with the valley of the Indus, or any other river, are of historic importance. The love of history, the care of historical monuments, is one of the main evidences of civilisation as contrasted with barbarism, which only comprehends the present and its material interests. It is in the nature of money speculations to lead back even intelligent and well-bred men from the spiritual civilisation which their fathers have acquired into the spiritual barbarism from which their ancestors have escaped. The vice of exclusive devotion to finance has infected the whole administration of Egypt, since the departure of the one financier who adds to his special genius for dealing with money an enlightened interest in higher things. Therefore, when Sir Benjamin Baker tells us in conclusion 'that the whole question may safely be left in the hands of our able and tried representatives in Egypt,' he asks us to do what the recent

history of Egypt commands us to refuse. Lord Cromer and his colleagues have proved over and over again that, in questions concerning the antiquities of Egypt, they are the very last people to be trusted. They have either openly expressed their contempt for this department of Egyptian wealth, or they have used it as a sop to humour the sensibilities of the French, whom they desired to oust from other departments. They have surrendered the whole charge of the antiquities to the French exclusively, so much so that an Englishman, desiring to excavate at his own cost, has to seek permission from a Frenchman in Egypt. They have long neglected to extend police control to the care of tombs and temples, which are being ravaged by natives and dealers without let or hindrance. They have hitherto omitted to find a safe housing for the vast treasures now in danger of destruction at Gizeh. On every question concerning antiquities they have shown themselves either utterly careless or utterly weak. And yet these are the men in whose hands we may safely leave the present problem!

Sir B. Baker, at all events, has not supplied us with a single shred of good argument in favour of the proposed scheme. Perhaps there are other and better reasons for the proposal. If so, let them be produced and subjected to an unbiassed discussion before the commission of what now appears to be a great crime.

J. P. MAHAFFY.

THE PROPOSED NILE RESERVOIR

II

THE SUBMERGENCE OF PHILÆ

SOME years ago an opportunity was afforded me, in the pages of this Review, of calling attention to the destruction that menaced the Arab monuments of Egypt. It would be out of place at the present moment to reopen that discussion except in so far as it bears upon the question of the preservation of the monuments of Ancient Egypt.

Less fragile than the graceful structures that adorn the modern cities of the East, these monuments afford, with their inscriptions, a lasting record of a bygone civilisation such as no other country in the world has yielded. At the period referred to it was generally believed that the temples of Ancient Egypt were safe in the custody of the eminent men entrusted with their safety and preservation. It is only lately that the decay inseparable from the work of human hands has attracted the attention of the guardians appointed to protect these precious relics. A society has been formed, at the suggestion of Mr. E. J. Poynter, R.A., now Director of the National Gallery, for the special purpose indicated by its name—The Society for the Protection of the Monuments of Ancient Egypt. In his capacity of honorary secretary, Mr. Poynter has worked with unremitting zeal in conjunction with his colleagues, among whom may be reckoned several eminent engineers, with the view of securing the objects of the society. Their exertions have, in several instances, been crowned with success. The steps that are being taken for the preservation of the great temple at Karnac will, it is hoped, arrest the disintegration that threatens the columns of the Great Hall, and at Abou-Simbel the Egyptian Government has, at the instigation of the society, adopted measures which will protect the temple from a serious danger to which it was exposed. It will readily be believed that the society received with consternation the news that the beautiful island of Philæ, with its group of temples—that gem of the Nile which, for a century at least, has won the admiration of every traveller—is menaced with destruction.

The Technical Commission on the question of reservoirs have

expressed their unanimous opinion that a reservoir should be constructed in the Nile Valley, rejecting the Wady Rayan project as being too costly; but, after examining the various projects, they disagree as to the one most suitable for adoption. Sir Benjamin Baker and Signor Torricelli are decidedly in favour of the dam at Assouan. M. Boulé, the third member of the commission, rejects the Assouan scheme, on account of its interference with Philæ and its temples.

It would be impossible within reasonable limits to enter at length into a discussion upon the different phases of a difficult and intricate question, but Sir Benjamin Baker, whose opinion on the engineering features of the case I should be the last to challenge, leaves the opponents of the scheme no alternative but to reply. It is hardly necessary to say that any question involving the welfare of the Egyptian people is deserving of our most anxious consideration. The point where we are at issue is the manner in which that desirable end is to be attained.

Sir Benjamin Baker rests his arguments a good deal upon the belief that the people of Egypt are profoundly indifferent to the preservation of monuments belonging to an age too remote to appeal directly to their understanding; but surely this is an argument that cuts both ways. It is usually regarded as a function of a protecting Government to foster every civilising agent that would promote the welfare of the people. It is true that he offers as a solatium the prospect of more abundant crops, but under a wise and honest system of government, the reverse of that under which the native inhabitants have so long groaned, they would still have enough to render them the envy of many nations less favoured by nature so far as the resources of their country are concerned.

The surpassing beauty of the spot and its surroundings have perhaps thrown into the shade other aspects of the question of even greater importance than the threatened submersion of Philæ. A letter addressed to the Society of Antiquaries by Mr. Somers Clarke calls attention to the disastrous consequences that would ensue if ever this gigantic scheme were carried into effect. The summary inserted in the *Times* of the 13th of April would be too long for insertion here, but a brief extract may help to prove that it is not only from a sentimental point of view that the question should be regarded. Mr. Somers Clarke writes:

The irrigation engineers have recommended a vast reservoir, the base of which would be formed by a dam placed at a short distance below the island of Philæ. The dam will create a reservoir of enormous extent, not only drowning the island of Philæ but extending southwards into Nubia for nearly a hundred miles. When full the waters of the reservoir will rise several feet above the highest level of the pylon of the Temple of Isis at Philæ. The rocks surrounding the island are full of *hieroglyphic inscriptions*; these will spend many months under water, and there *is yet much to be discovered* in the immediate neighbourhood. . . .

It may be mentioned in passing that the Temple of Isis is adorned with painted columns, the preservation of which is a marvel, considering the age of their construction. Rich harmonies in green and blue, relieved in places by bands of red—colours which the lapse of ages has left almost untouched—will be left to moulder in the waste of waters by which they will be submerged.

Mr. Somers Clarke mentions other structures which would be destroyed, including a Ptolemaic temple at Debôt, retaining its original girdle wall, and Gertasseh, a small hypæthral temple of great beauty and in fair preservation, and the most magnificent temple to be found in Lower Nubia, at Kalabsheh—all to be submerged, and the inhabitants transported he knows not whither.

The concluding passage refers to a matter that seems hitherto not to have been fully considered. How are the unfortunate inhabitants to be compensated for the discomfort and privations which no pecuniary reward can adequately allay?

The promoters of 'the biggest thing in the world' and their underlings will doubtless reap a rich harvest. Undisturbed by the adverse criticism of 'mere sentimentalists,' which they can afford to despise, they will embark with a light heart in a scheme that will earn for us the just reprobation of the whole civilised world.

As an instance of the *petitio principii* which it would be hard to match, Sir Benjamin Baker dogmatically asserts that, no other site being available, the thing must be done. When railways were first introduced into Russia it was represented to the Tzar Nicholas that a certain projected line should be made to deviate from its intended course in order to avoid injury to some valuable property, upon which H. I. M. called for a rule and drew a straight line from point to point, saying, 'That is the direction the line must take. This is the autocratic tone adopted by the English Commissioner with regard to the island of Philæ. Frenchmen may exclaim, *rien n'est sacré pour le sapeur*.

Mr. Heathcote Statham, the editor of the *Builder*, alluding to the proposal to meet the case by removing these temples to a neighbouring island, writes:

The mere fact that such a proposal should have been made only shows how totally impossible it is for engineers to understand the architectural aspect of the subject.

In the same connection Mr. Cecil Torr says:

The temples at Philæ were designed for the island. They follow the curves of the shore and the undulations of the ground in consummate harmony with every feature of the landscape. Put them on another site and all this beauty is destroyed.

It has been the custom with a certain class of archæologists to underrate the Ptolemaic temples of Egypt on the ground that, being

comparatively modern, they must necessarily represent a debased period of art, an opinion that I must distinctly traverse. Greek influence has imposed a certain grace of line into their contour that more than compensates for the absence of the massiveness which characterises the earlier periods of Egyptian architecture. The fact, moreover, that they form a link in the chain that marks their evolution and transition confers upon them a peculiar interest and renders it all the more imperative that their preservation should be demanded and insisted upon. Eager to seize upon any plea that might seem to favour their designs, these iconoclasts seek to minimise the gain to humanity and true civilisation offered to the world by these splendid monuments, and measure their enterprise by its *bigness* rather than by any inherent merit it may possess.

It is difficult to believe that Sir Benjamin Baker can be in earnest when he suggests that the temples at Philæ might be raised above the water level, a feat which he says could be accomplished without injury to a single stone. Yet he insists upon this monstrous proposal in terms that are calculated to appeal to the uncultivated taste of such of his countrymen as would regard this *tour de force* in the same light as an exhibition of strength by an acrobat at the Aquarium. Granting that this treatment of the ruins were capable of achievement, what are the conditions under which they would be seen? Perhaps the best way of answering this question will be to quote Sir Benjamin Baker's own words :

When raised (he says), the ruins surely must be of greater interest to any intellectual tourist than before. Half of the wonder and admiration excited by the monumental works of Ancient Egypt arises from the magnitude of the masses handled and transported by the old Egyptians rather than from their artistic merit. It would be in accord, therefore, with the spirit of the surroundings *if English engineers raised tens of thousands of tons where the Egyptians raised hundreds.*¹

It would be difficult to find words to characterise the absurdity of this statement. Has Sir Benjamin Baker ever condescended to read any of the books descriptive of the temples of Egypt: the great work published under the auspices of Napoleon; in Germany, Lepsius and Ebers; in our own country, Sir Gardner Wilkinson and Flinders Petrie, and many others? Did these men find nothing to admire in the Great Hall at Karnac, the temple of Luxor, or the wonderful and awe-inspiring Abou-Simbel beyond their measurement and weight? Even a visit to our British Museum would suffice to dispel the illusion that size is the chief element in the grandeur of the Egyptian monuments. Then we are told that from the artistic point of view the appearance of Philæ would be enhanced because the temples would rise out of a wide placid lake instead of appearing in a hollow!

If, with the permission of Sir Edward Watkin, Sir Benjamin Baker were to conceive the plan of transporting Stonehenge to the

¹ The italics are my own.

summit of Snowdon in order to make room for some projected railway, it would scarcely surpass in extravagance the project of hoisting up the temples. The Cook's tourist credited with the exclamation 'How wonderful!' would, it is likely enough, return to his steamer dazzled by the magnitude of this engineering feat, but possibly it might fail to excite the enthusiasm of a class of travellers who would regard these precious relics from a different standpoint.

Passing to the practical consideration of the comparative sites that have been suggested for the reservoirs, Sir Benjamin informs us that:

The Government engineers submitted four projects to the Commission; but, reading between the lines, it was clear enough that they had little confidence themselves in the practicability of three out of the four plans, and they expressly threw the final responsibility of the rejection upon the Commission.

Now it is not for me to dispute the faculty claimed by Sir Benjamin Baker of reading between the lines, but it is unfortunate that we are not in possession of the causes of this want of confidence. This important factor in the consideration of the question is passed over lightly, as if it were self-evident. We are not, for instance, clearly informed of the reasons for rejecting Mr. Cape Whitehouse's 'brilliant and original suggestion' in favour of the Wadi Rayan reservoir, except on the ground of expense and *certain elements of doubt* as regards the supply of water and the effects of percolation. The second Government project was that of a dam at Gebel Silsila, where the rock was found to be of inferior sandstone with bands of clay. This scheme appears to have been rejected on more substantial grounds, but neither of the above schemes would interfere with the monuments. The next project was for a dam at Kalabsheh, which it was admitted had many advantages, but was rejected on financial grounds in favour of the only other alternative, the selection, namely, of the Philæ dam. Here M. Boulé, the French Commissioner, diverged from the opinion of his colleagues on the ground that it would involve the injury or destruction of the temples at Philæ. This demurrer, redounding as it does to his honour, is a fair index of the reception that will assuredly be accorded to the scheme in France and on the Continent generally.

Now the objections raised to the first three projects on the ground of expense would equally, or perhaps in a greater measure, apply to the Philæ scheme when, coupled with the compensation to the inhabitants of the flooded districts we add the cost of raising or removing the temples—an item the expense of which is only approximately stated. With regard to the suggestion that the temples might be raised so as to dominate the great mass of water intended to be accumulated above the dam, the question arises, What would be the aspect of these buildings at certain seasons, with the river at its normal level? How would the intervening spaces be filled up? At present, resting on their natural level, the fallen stones and débris

constitute a natural framework to these beautiful ruins. The palm trees—some of the finest of which have, I regret to say, already been ruthlessly destroyed—would, of course, perish. The acacia bushes which fringe the shore would suffer the same fate, and the temples would rise in their naked baldness and present a spectacle so ridiculous that their greatest admirers would rather see them totally submerged. No assurance on the part of the British Commissioner that the Temple of Isis, with its frescoed columns, could be raised without injury, will suffice to allay our anxiety on this score. The stones might be raised with safety, but the plaster upon which the colours are laid would infallibly crack and perish.

Sir Benjamin Baker may rest assured that a large number of our countrymen who hitherto have viewed the occupation of Egypt with satisfaction would regard it in a very different light if it involved the destruction of any important monument; and while the question is still trembling in the balance, it behoves all who desire to maintain our position in that country to raise their voices in condemnation of such a scheme. Mr. Gastin, the Under Secretary of State, is, we are assured, strongly in favour of saving Philæ, if this can be done consistently with the plan of constructing a dam 'on a spot best calculated to serve the interests of the country,' and we might find comfort in this assurance were it not vitiated by the fact that he favoured the scheme of removing the temples to a neighbouring island—meaning probably Biggeh. But this project seems now to have been abandoned in favour of the equally fantastic plan of raising the temples to a higher level—a choice of evils with which we need not trouble ourselves, seeing that either plan would be preposterous.

Nothing could be more infelicitous than the holding up of the present condition of Rome as an example and a justification of the proceedings that threaten to injure or destroy some of the monuments of Ancient Egypt. 'Two blacks do not make a white,' and if the Italians of the present day think proper to deface their capital by 'improvements' tending to reduce it to a commonplace modern city, it is an example to be avoided rather than copied. It should, however, be noted to the credit of the Italian Government that the antiquities have as far as possible been spared, so that, although the picturesque element is missing, the archæologist has little to complain of.

That art and engineering have not always been divorced is evidenced in the structures of ancient Rome, and, later, the period of the Renaissance affords examples, especially in Italy, of what their combined forces have been able to achieve. The dark cloud that now obscures the beauty and interest of modern Rome, the utter tastelessness that pervades most of the so-called improvements that render a visit to the sacred city a source of regret to the traveller who knew her before this relapse into barbarism—all this is held up to us as an

excuse for the drowning of a vast tract of country in Nubia, culminating in the submersion and, *ipso facto*, the destruction of the island of Philæ.

Sir Benjamin Baker takes exception to the term Vandalism in connection with the proposed destruction of Philæ. It must be admitted that the comparison is hard upon the Vandals, who, after all, were simply barbarians let loose upon the world in search of loot; while the modern engineers, with all the advantages of education and culture, seem to think that the world was created solely as a field for their enterprise and for opportunities of gain. This is apparent in the suggestions they offer us in compensation for the injury they would inflict upon places hallowed by association, and monuments which reflect the mind that conceived them. Absolutely without the *religio loci*, so important an element in the appreciation of architecture, the promoters of this scheme seek to satisfy us by promises the performance of which would either prove abortive or result in a great sham that would render us the laughing-stock of civilised Europe. Fortunately, the Commissioners are not the final arbiters on this question. The ultimate decision rests with higher powers, who, it is to be hoped, will not hesitate to condemn a project that would be a stigma upon the British occupation of Egypt.

FRANK DILLON.

THE EVICTED TENANTS BILL

AN article on this subject has recently appeared in this Review from the pen of Mr. Michael Davitt. Other Reviews have also dealt with the subject before the Government Bill was published, but so far as I am aware there has been little or no public comment since the Bill has been printed and circulated.

Moreover, the articles I have seen have approached the matter rather from the points of view of the political partisans on either side. My attitude is somewhat different. I approach the subject from an Irish point of view, disregarding party considerations. I shall try, moreover, to treat it without any landlord bias, and especially at the outset I wish to disclaim any sympathy with the vindictive feelings imputed (though I am sure in the great majority of cases unfairly) to the landlords affected. I heartily endorse every word quoted by Mr. Morley from Mr. Balfour's speech in 1891, on the 13th clause of the Act of that year :—

And for my own part, if I were an Irish landlord, even if it were not wholly to my own personal and pecuniary interest, I should desire to restore peace to that part of the country in which my property was situated, and to see that on fair, equitable, and even generous terms the tenants were restored to their ancient homes.

Such vindictive feelings, operating as a bar to reinstatement of solvent tenants, I believe to be quite exceptional, though landlords who have been attacked by 'the Plan' would be more than human if they felt very charitably disposed even towards the tools of that conspiracy. But it would be wiser, in my opinion, to afford a *locus penitentiae* even to the ringleaders, if solvent, or capable by any means of retrieving their character and position.

Another argument I wish to repudiate is that of draining the Land League funds, which is not only, in my opinion, an unworthy, but a most misleading one; for had it not been for the split among the Nationalists, I am satisfied that an appeal for the evicted tenants would have brought more money from America and Australia than would have sufficed to carry on the war on the campaign estates. And though the continuance of the split gives the argument a certain tactical importance for the time which politicians cannot ignore, *it is not one which a statesman desiring the pacification of the*—
v can avow or on which he can greatly rely.

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THE
FORTNIGHTLY REVIEW.

No. CCCXL. NEW SERIES.—APRIL 1, 1895.

FREDERIC CHAPMAN.

Born November 15th, 1823 ; died March 1st, 1895.

It is with great regret that we announce to our readers the death of Mr. Frederic Chapman, the managing Director of Messrs. Chapman and Hall, Limited, proprietors of the FORTNIGHTLY REVIEW.

Mr. Chapman was the popular centre of a wide circle of friends and acquaintances, literary, artistic, and social; and the news of his somewhat unexpected death on the 1st of last month has been received with wide-spread sympathy and sorrow. His death breaks a link with the literary past. He was one of the diminishing company of those who had been in personal touch with the great writers of the early and middle Victorian period, with Thackeray and Dickens and Thomas Carlyle, with both the Lord Lyttons, Anthony Trollope, John Forster, the Brownings, Harrison Ainsworth, Charles Lever and Whyte Melville; with all of these men he was on terms of cordial personal acquaintanceship and of some he was the life-long friend.

No man possesses a host of friends and well-wishers, high placed and low, without some rare and generous qualities of his own, and Mr. Chapman was a man of a hearty and most companionable nature, who under the thin disguise of an incisive manner, which imposed on no one, hid a fund of uncommon kindness and geniality.

Frederic Chapman was born at Hitchin, in Hertfordshire, in the house that once belonged to his ancestor George Chapman, the Elizabethan dramatist and translator of Homer. Of the famous Elizabethan Mr. Frederic Chapman was the lineal descendant. He was thus a countryman born and bred, and fond of country ways. He was a fine shot and a straight rider, and all his life long he delighted in rural life, but his country breeding did not stand in the way of a very busy London career. In early manhood he went into the publishing house of Messrs. Chapman and Hall, his cousin, Mr. Edward Chapman, being then the leading member of the house which soon became famous through its connection with Dickens, Carlyle, and other eminent writers. In 1864, he became the head of the firm. In 1880, the business was converted into a Limited Liability Company.

THE SITUATION IN EGYPT.

THE performance of what threatens to become the annual pantomime at Cairo, in which the Khedive Abbas and the British authorities play their accustomed parts with the ease and grace of practised actors, while the well-trained press and telegraphic *claque* applaud or hoot the right persons at the right times without any hitch, has one distinct advantage—it calls the attention of people in this country to what is going on in Egypt. In former years the attention thus arrested and bestowed has been fleeting, but this year it has the appearance of being more permanent. The press, in its monthly, weekly, and daily productions, has this year devoted more time to the state and condition of Egypt than it has done for many years past, and there are healthy symptoms that its views on the subject are more independent than they were formerly, and that they are founded on knowledge drawn from other than purely official sources. The general idea expressed up to the present time has been one of smug content at the great success that has attended Great Britain's unselfish and almost heroic efforts for the benefit of the fellaheen, with a half-pious, half-contemptuous regret that these latter are too benighted to realise the solid advantages they have gained, and too degraded to recognise the altruistic motives of their great benefactor. This year an uneasy feeling of doubt seems to be disturbing these pleasant dreams, and hints as to the failure of the British occupation in Egypt are freely expressed by many of our instructors in the press.

The word "failure" has an ugly sound, and when applied to the enterprise of a great Power should not be used lightly. Popular opinion has a tendency to rush to extremes, and if on any subject opinion has been for a time too favourable, it has a habit of becoming for another period too unfavourable. The question as to whether the occupation of Egypt by Great Britain has proved a success or a failure depends mainly on the object the Government of the country had in view when the occupation was decided on. If, for instance, the object was merely to restore order, save the country from bankruptcy, and establish financial credit on a firm basis, there cannot be the shadow of a doubt that the results of the occupation have been as successful as they possibly could be. If, on the other hand, the object was not only this, but also to teach the Egyptians the art of self-government, and so to manage their affairs that they might recognise and appreciate the advantages of a civilised form of government, and learn to hate and

despise the semi-civilised government under which they had lived from time immemorial, the result is undoubtedly a failure.

One grave mistake which, in my opinion, has been made by those who are responsible for the administration of affairs in Egypt during the last twelve years, has been their evident distrust and fear of public opinion in this country, and their dread of a discussion on Egyptian matters in the House of Commons. Public opinion, doubtless, often, for a time at least, goes wrong, and debates in the House of Commons on foreign or colonial affairs do not attain to the high level they used to in times past, and may occasionally be productive of mischief; but still Parliament is responsible for whatever is done in the name of Great Britain at home and abroad, and the only power beyond and behind Parliament is public opinion, and it is essential that both should be fully, and not partially, informed on all matters done on their responsibility. This is not, I know, the official view in many quarters. Well-informed and thoroughly capable officials have a not unnatural contempt for the ignorance of matters with which they themselves are well acquainted, displayed by a large majority of the members of the House of Commons. They are experts, and the representatives of the people are not, and it would be absurd to expect them to be such. But it is for the experts to give all the information they possess, and then to leave the responsibility of decision with those who are elected to bear it. All ledgers have two sides, but in Egyptian affairs connected with the British occupation, the aim hitherto has been to let the general public and Parliament see the credit side only.

The credit side is certainly one of which no nation need be ashamed. In 1882 the country was in a state of anarchy and impending bankruptcy, and the intervention of Great Britain restored law and order, and under the British occupation bankruptcy has been averted and the finances placed on a sound and healthy basis. At the time of reconstruction, in 1883 and 1884, this country and Egypt were most fortunate in being able to avail themselves of the services of one of the ablest financiers and administrators of the day, then Sir Evelyn Baring, now Lord Cromer. He not only restored equilibrium in the finances, but, by his far-sighted financial policy, has permanently increased the wealth of the country. In future times the chief monuments of Lord Cromer's administration in Egypt will be the completion of the Barrage, and it is one of which any Administrator may well feel proud. The credit of overcoming the enormous engineering difficulties is entirely due to Sir Colin Scott Moncrieff, but Sir Colin would never have had the chance of overcoming them had it not been for the foresight and firmness of Lord Cromer. He saw the financial advantages of the scheme, and provided the necessary funds at a time when it was

most difficult to procure them. When Egypt appeared almost crushed under the weight of her debt, and when a new loan was absolutely necessary to pay the Alexandrian indemnities and other pressing claims, he insisted firmly on the loan being so increased that the completion of the Barrage, which had hitherto been despaired of, should be made a certainty. It has been completed, and it is impossible to exaggerate the importance of the benefits its completion has conferred upon Egypt. It has more than doubled the quantity of ground devoted to the cultivation of cotton; and had it not been for this, Egypt, in consequence of the enormous decline in the price of cotton, might again this year have been in serious financial difficulties. It has already added largely to the wealth of the country, and, with the new reservoirs which are contemplated and the new system of irrigation, it is certain that that wealth will be greatly increased.

In addition to this the good work commenced under the dual control of England and France, of levying the taxes fairly, and of adapting the collection of them to the convenience of the peasants who have to pay them, and of abolishing the *corvée* and the use of the *courbash*, has been successfully carried out. A new and well-equipped and well-drilled army has been formed under Sir Francis Grenfell, and has been kept up under Sir Herbert Kitchener. The police have been re-organized, and though the re-organization may not have been so successful as the formation of the new army, the re-organized force is a great improvement upon that which existed prior to 1882. The conditions of the prisons have been greatly improved under the supervision of Dr. Crookshanks, and efforts have been made, though not with sufficient zeal and energy, to amend the administration of justice. The management of the street traffic in the few towns is greatly ameliorated. The helter-skelter fashion in which vehicles used to rush about without any attention to the rules of the road, is stopped, and in Cairo itself the traffic is really better controlled than it is in Paris, and almost as well as it is in London. All the towns have thriven under British protection. In Cairo, house building has progressed at a greater rate comparatively than in any European capital, during the last twelve years, and the magnificent new hotels and splendid buildings, with good shops on the ground floors and superb suites of apartments in the upper stories, bear ample testimony to the increased prosperity of the city. As to the Egyptians generally, a highly educated and well-informed Egyptian, whose whole life has been passed in Egypt, and who knows the country districts as well as the towns, said to me some little time ago, "that never since Egypt was a nation had the people been so prosperous or enjoyed such liberty and personal freedom as they had done, and did under this British occupation; in fact," he added, as

though it was a thing unheard of, which it is in the East, "everybody can do what he likes and go where he wishes, without fear of being stopped at every turn by some official."

The advantages which all the inhabitants of Egypt have gained, and are now enjoying, under and by reason of the British occupation are enormous, and the credit side of the ledger stands very well for Great Britain, and to the uninitiated the one cause of wonder is that the Egyptians still are not happy, but hate their benefactors. That they do so there seems little doubt. I do not think the fellaheen in the villages do; and were the matter placed before them in a manner which they could understand, whether they would prefer the British occupation with the lives they have led for the past twelve years, or the Khedivial or Vice-regal Government of the years before, they would at once pronounce in favour of the continuance of the occupation. But the natives in the towns, according to the able special correspondent the *Times* has now in Egypt, and according to all I could learn myself, dislike the British more than ever. In December last I noted down a conversation I had with the same Egyptian whose opinion on the prosperity of Egypt I have already mentioned. He said, in reply to a question I addressed to him, that the "English are simply detested by the natives." And when I asked him whether this had always been so, he replied, "No. It is chiefly since the accession of the present Khedive."

"Why is it?" I asked.

"Because the natives have begun to despise the English, and in this country contempt means hatred."

"But why," I asked, "do the Egyptians despise us?"

"Because they think you are weak. They see that the English authorities do not protect English interests, and that they do not ever stand by Egyptians who support them, and this they attribute to weakness. They see you give way to any pressure that may come from the young Khedive or the French, and this they put down to weakness, not to good nature, as you flatter yourselves. The Khedive has stuck to and rewarded his supporters, while the English Government have deserted theirs, and the natives think the Khedive powerful and the English weak. There are numbers of Egyptians who used to support the English who have now been to the Khedive, and on their knees asked his pardon for having done so, and they have promised never to do so again in future. Then," he adds, "there is that terrible Besendila affair! That has shaken the confidence of the natives in British honesty and straightforwardness more than I can say. The outlook is very black, and it is all your own fault."

This and other results may be accounted for by a glance at the debit side of the ledger. The chief item, however, which stands at

the top is well known to the British public, though I doubt whether its grave and disastrous importance has ever been realised by them. It is the abandonment of the Soudan in 1884. This was the most serious and most fatal of the many mistakes made by the Gladstone Cabinet of 1880-1885. Its results, up to the present time, have been the throwing back of vast provinces from a semi-civilised state to a state of barbarism and anarchy, the sacrifice of over five millions of lives, the waste of a vast amount of British and Egyptian money, the total destruction of a trade lucrative to Egypt and Great Britain, and the imposing upon us the duty which must some day be performed of reconquering the country. In addition to this, it has created a new subject of contention and irritation between England and France. Lord Cromer at the time was the British Consul-General, but it is not fair to place the responsibility of the abandonment upon his shoulders. His first acquaintance with Egypt was in a financial capacity in 1877, and from that time to the time of his appointment as Consul-General in 1883, he had been employed solely in financial matters in Egypt and in India. To the financier the Soudan might well have appeared an expensive luxury, as the deficit it brought to Egypt was some £300,000 a year; and as Lord Cromer was appointed Consul-General with a special view to re-organizing the finances of a country that then appeared to be in the throes of bankruptcy, it is no wonder that he acquiesced in, if he did not recommend, the abandonment policy in favour with Lord Granville and the British Cabinet.

The blame is theirs, and what made their responsibility much greater was that the course was adopted in spite of all the best opinions on the subject being against it, including those of the Khedive Tewfik, the then leading ministers in Egypt, Sheriff, Riaz, Nubar Pashas, of Sir Samuel Baker, General Gordon, and of the able correspondent the *Times* then had in Egypt, Mr. Moberley Bell. That the Power that holds Cairo should also control Khartoum, was the maxim held by such Eastern statesmen as Mahomet Ali and Ismail Pasha, and it was recognised by all European statesmen as sound, and the non-recognition of this principle by us in 1884 has now rendered it incumbent upon us to restore the Soudan to Egypt before our occupation ceases.

Though, however, the abandonment of the Soudan is the chief mark against Great Britain on the debtor's side of the ledger, it is not the one that has affected our popularity most. The memory of it may still rankle in the bosom of some of those who have guided Egypt's destinies in former times, but it cannot be said to affect the populace much. The items on this side of the book which have done most harm are the general weakness of our administration, and the cynical disregard it has displayed to the claims of justice and to the

feelings of the natives, and the lack of political foresight displayed in many matters, and especially in the management and arrangements of the different governmental departments.

The opinion prevalent in England has been, and is, that the one element to be admired in our administration of Egypt is its strength. Allusions are constantly made by apparently knowing journals to the iron hand and velvet glove, and whatever differences of opinion they may have had as to the material of which the glove was made, there has been none as to the composition of the hand. People in Egypt may not know much about the glove, but they will tell you that the hand that has ruled since the accession of the present Khedive is not one of iron, but one of potter's clay, which has been twisted into all kinds of shapes and contortions by the youthful Khedive and his playmates, as well as by the emissaries of France. The weakness on many occasions displayed in dealing with the Khedive and the French is almost incredible. The Khedive is a Turk, and it would be well if those who manage affairs in Egypt would act upon the principles laid down by Lord Palmerston, who was the best friend the Turks had in Europe.

"The Turks," he said, "respect you according to their opinion of your *force*. If, however, you wish that force to have a permanent influence, and to be unaccompanied by dislike, you must blend its exercise with justice; and if you wish to arrive at a quick result through all that ambuscade of intrigue and doubts and fears and prejudices which will be sure to be secretly formed against it, you must tell the Turk what he is to do, why he is to do it, when he is to do it, and show him that you only ask quietly and reasonably what you have a right to demand. In this way and in this way alone will you do business with him. If he sees you act thus he will not only agree with you, but rely upon you."¹

What the Turks and the Egyptians expect is force and firmness. Weakness has been the characteristic of our dealings with the present Khedive. He was a mere boy when he came to the throne, and it was only right that he should have been treated, as he doubtless was, with great kindness and consideration. But this treatment is not incompatible with firmness. The moment he kicked, he should have been firmly resisted, and he would not have kicked again. The bitter consequences of the British Government yielding to him, when he was allowed to dismiss Mustapha Pacha Fehmi, has been that all Ministers are afraid of supporting Great Britain, and the young Khedive has been encouraged to go on kicking for ever. Some people in Egypt think that the weakness displayed by Great Britain was part of a deep-laid Machiavelian scheme of giving the youthful ruler rope enough so that eventually he might utilise it. I am certain it was nothing of the sort. I think it was the result of

(1) *Viscount Palmerston, K.G.* By the Marquis of Lorne, K.G. Sampson Low & Co. P. 74.

a somewhat careless good nature. It was, and has proved itself to be, thoroughly misplaced kindness. Had the British Administration acted in a statesman-like manner, they would have nipped the nascent rebellion in the bud, insisted on all the Ministers they had appointed keeping their portfolios, and dismissed from the palace all the evil counsellors who were trading upon the Khedive's youth and credulity. Instead of that, the Ministers friendly to us were dismissed, and the evil counsellors promoted and rewarded. The result of our weakness has been to create two distinct parties in Egypt—the Khedivial and the British; and the Khedivial is far the largest, and, as far as native support goes, the strongest. The natives have no course open to them but to support the Khedive against us. They have not forgotten how we deserted our allies in the Soudan, and especially at Dongola; and when they are constantly hearing that people of authority in England consider the occupation as only temporary, and one which may be put an end to, a sense of self-preservation compels them to side with the Khedive.

The weakness displayed by the British Administration in dealing with the French is even greater than that which it has shown in dealing with the Khedive. Great Britain is responsible for the government of Egypt, and it was by the expenditure of British money, and at the cost of British lives, that order was restored and is maintained in the country, and yet it is France that reaps all the benefit; and she only growls at us for letting her get it. All the departments are practically in French hands, though nominally at their head there may be British advisers. The most striking instance of this is the Contention, the legal department for conducting the law cases of the Government, whose functions are very similar to those of our Attorney-General and the Solicitor to the Treasury combined. The three principal officials in the office are French Corsicans, and all the minor officials and clerks speak French, and the English language is never heard. British interests are often at stake in the law courts, and it may well be imagined what protection they get from a department composed of such elements. The first patriotic duty of a Frenchman in Egypt, if not elsewhere, is to be anti-English, and in Egypt the French are all earnest patriots. Is it any wonder that it is absolutely an impossibility for any Englishman to obtain justice in Egypt? There is no doubt about the fact. A recent case is that of Mr. Fell; and it is to be hoped that his case may draw attention sufficiently to the subject to render a radical reform necessary.

Mr. Fell is a tramway contractor, carrying on business at Leamington, of which town he has been the mayor. He is a member of the National Liberal Club, a strong supporter of her Majesty's present Government on all matters excepting those affecting Egypt,

and has already stood as a Radical candidate for Parliamentary honours in one of the Worcestershire divisions. In 1890, he obtained a concession for constructing tramways in Egypt, which has since been taken away from him and handed over to a Belgian Company, supported by French influence. Mr. Fell, with that faith in the law which is a distinguishing characteristic of our countrymen, brought an action against the Government for damages, and, as might have been anticipated by any one acquainted with Egyptian law suits, has lost it. Space prevents me entering into the merits of his case, and I only wish to call attention to two points in it as illustrating the mode of action of the "Contention."

One of the points in dispute was, whether an extension of time had been given to Mr. Fell, and to prove that it had he put in a letter of Sir Colin Scott Moncrieff, who was then the Under-Secretary of the Public Works Department. The letter was written on official paper from the proper office, but Sir Colin omitted to put under his signature his official description of Under-Secretary, and he also omitted to register the letter in some book kept at the office. The "Contention," acting for the Finance Department, at once took advantage of this omission of the Government's own official, and pleaded that the letter was not binding upon the Department, and the Mixed Courts have upheld the plea! The pleasure to the French officials of seeing an English contractor hoist by a British petard and suffer because an English official, who had conferred the greatest benefits upon the country in whose service he was, had made a slight omission in signing a letter, may easily be imagined!

The other point was this: Mr. Fell, upon the granting of the concession, had deposited with the Finance Department unified bonds of the value of £2,200, to secure the sum of £2,000 which under the concession he was bound to deposit. When the concession was finally withdrawn and, as the Finance Department contended, the £2,000 forfeited, Mr. Fell asked for the remaining £200, but he was told that the bonds had been sold on May the 12th, 1891, when they only realised £2,090, and that therefore, only £90 was due to him. This statement was made in the pleadings by the Contention, and yet the whole turns out to be a fabrication. The bonds had never been sold at all!

These are only specimens of what occurs in the Departments. I could mention many more if space allowed. Mr. Fell was so disgusted that he wrote to one of the English officials in the following epigrammatic language: "It is my misfortune to be an Englishman. If I had been an Armenian, a Jew, a Corsican, a Greek, or anything else but an Englishman, there is not a man in your Government who would have dared to have done to me as they have done." The official to whom this letter was written admitted its

correctness to me, and bitterly deplored the helpless condition in which commercial Englishmen found themselves in Egypt in comparison with the men of business of other nations; "but," he added, "what can you expect when all the departments—though some may have an Englishman as nominal head—are full of Frenchmen, or Copts and Syrians who know French, but who do not know English, and consequently always side with the French."

Englishmen do not suffer at the hands of the Contention alone. It is the same in all departments. The fact that, out of the five millions spent upon railway plant since the occupation, only fifteen per cent. has found its way to British pockets, while seventy per cent. has been absorbed by France and Belgium, speaks volumes on the subject. Notwithstanding the number of new bridges that have been made, not one British tender has been accepted. The official answer to this is glibly given that all contracts are given to the lowest tenders. Considering the respectful attention the Government at home pay to the trades unions, it would have been thought that one of the first lessons they would have taught the Egyptians is that the lowest tender system is a very bad one. Were tenders invited based upon an estimate of fair wages and the proper prices of good materials, with specifications that could be strictly carried out, there is no doubt that English contractors would have now, as they had before the occupation, the majority of the contracts, and both England and Egypt would be the gainers; but as the governmental departments are at present organized, they have not a shadow of a chance.

Had the British administration had any political foresight, they would, from the very first moment of the occupation, have done everything to encourage the learning and use of the English language. They have not only neglected it, but have actually discouraged the efforts of voluntary workers. Incredible as it may sound, it is well known that when many eminent British officials like Sir Colin Scott Moncrieff, Sir John Scott, Rogers Pasha, Mr. Dunlop, and others tried to make good the culpable neglect of the British Government, and out of their own pockets subscribed funds to give prizes for efficiency in the English language, and when the experiment had proved an enormous success, the British Administration withdrew its countenance from the attempt because the French took umbrage at the idea of the English language competing with the French!

The consequences are what might have been anticipated. The French like us none the better. They despise our weakness, and, knowing what they get by playing upon it, are always trying to get more. With the French as with the Khedive, it is certain that had firmness been displayed by the British Administration in

dealing with them, their constant bickerings and querulous complaints would long ago have ceased.

The disregard often shown for the feelings of the native population is as foolish as it is reprehensible, and what my informant called that "terrible Besendila affair" is one glaring example.

This Besendila estate is a part of the domains of the Daira Sanich and is situated in the Gharbieh Province, and consists of some 120,000 feddans or acres of fertile land. The Daira wished to sell it and they decided to put it up to public auction. Before the sale it was pretty well known that the competition for it would rest mainly between a Greek Company, known as the Bohera Irrigation Company, of which Nubar Pasha's son was chairman, and a native syndicate known as Messrs. Abdul Bey et Bally & Co. The Greek Company had for many years received an annual sum of money from the Government to perform certain services, and under the agreement which had been made with them the Government was liable to pay this sum for some years to come, though the services were no longer required. Prior to the sale there had taken place negotiations between the Greek Company and the Finance Department, with the object of letting the company have the land in question and the government being released from paying future annual subscriptions; they were not successful and the property was put up to public auction. Both the bidding companies were equally solvent and both had paid the necessary deposit of £20,000. Eventually the native group bid the highest and the property was knocked down to them for £274,000. In due course under ordinary circumstances it should have been conveyed to them, but the Greek Company discovered that the purchase made was a good bargain and they cast envious eyes upon it, and then commenced a series of intrigues between certain agents of the Greek Company and certain members of the finance department, which, if only half that is publicly reported about them in Cairo is true, are discreditable in the highest degree to all concerned. It is commonly reported, and, as far as I know, it has never been denied, that no less a sum than £10,000 was spent by the Greek Company in what is vulgarly called "greasing the wheels." Be this as it may, the Greek Company got the property behind the backs of the native syndicate. It seems that with regard to the land sold by the Daira Sanich, the Government have the right of pre-emption, even if the land has been sold at public auction, if their advisers are of opinion that the property has been sold for too small a sum. But in this case the native company were so anxious to have the land that they were willing to advance upon the £274,000 for which the property had been knocked down, and it is said, that they sent such offer to the Financial adviser, but that he did not communicate it to the Government, who so managed

that eventually the Greek Company became possessed of the property for a lesser sum than the Egyptian group had offered.

The bitterness of feeling against Great Britain caused by this episode amongst the native population, it is impossible to exaggerate.

A question has been asked in the House of Commons, and the usual misleading answer given. What is requisite is a strict inquiry into the whole subject by some impartial persons, and a report to the House upon it. The worst accusations have been, and are, made against British officials, and are greedily swallowed and firmly believed by the native population. It is to be hoped that such an inquiry as the one suggested would prove their baselessness, and then the gain to the good name of our Administration would be clear. If, on the other hand, the inquiry proved that the charges, or any portion of them, were true, the action the British Government would be sure to take would clear this country from any complicity in the matter. To leave matters as they are at present displays a cynical indifference to our reputation for fairness, and must tend to lower our influence in Egypt.

The disregard to just claims by natives against the Treasury, and especially those arising out of the Soudanese disasters, is notorious. The claimants are referred to the native tribunals, but it is well known that, constituted as the legal department, the "Contention," is at present, such a reference is a mockery. It is true that many excellent English lawyers have given advice on legal reforms, and a most eminent lawyer and impartial judge now fills the post of Legal Adviser in the person of Sir John Scott; but he is impotent to carry out reforms. In such matters as these claims he is never consulted, as the consultation would in many cases certainly end in making the Treasury liable for considerable sums of money. If commentary was wanted on the real inefficiency of the native courts to try such cases, it is not necessary to look farther than to the recent action of the Government itself. Though, during the twelve years of the occupation, apparent efforts have been made to reform the native courts, the Government itself has had such little confidence in them, that it has been compelled to create a special tribunal to try criminal offences against British subjects.

Specimens have now been given on both sides of the ledger, and it is undoubted that considerable additions could be made to either, but for the purpose of this article they are sufficient. If it is asked on which side is the balance, the answer depends on what the balance implies. In the result total Great Britain has not gained, except from the fact that we still occupy the position; Egypt has gained much in every respect, except in the loss that she has sustained by being forced to abandon the Soudan. The European bondholders have been the greatest gainers, and they (and the majority are

French) will admit that they have gained more than they anticipated. The real cause of complaint is that Great Britain, who has borne the heat, and burden, and cost of the day, might have gained much, that the benefits to Egypt might have been much greater than they are, and that the bondholders might have been in exactly as good a position as they are now, if British policy had been different to what it has been. The only advantage to be gained by calling attention to this policy is in the hope that it may soon be entirely altered; if it is the results in the future will be very different to what they have been in the past. The folly of our weak and vacillating action in 1882 and 1883 is now acknowledged by all parties, and the only object of ever referring to it is to prevent such egregious blunders being repeated. Had the Ministry of the day, after Tel-el-Kebir, proclaimed a protectorate, undertaken the guarantee of any new loan that was necessary and done openly what they did covertly, as they were advised to do by all who knew the country, it is as certain as anything can be that almost all the disasters that have since occurred would have been avoided. These times and opportunities cannot be recalled, and the practical question is how can more recent defects in policy be made good.

The chief defects are uncertainty, want of continuity, and the air of mystery that surrounds our actions in Egypt. It looks as though Great Britain had never faced the situation, nor realised what the occupation of the country implies. In Egypt the government of the country is despotic. It must be so. It has been so for thousands of years. To expect to alter it, at least within a century, is only a dream of dreamers or a display of ignorance. At present Great Britain is the despot. The word despotism is not a favourite one in British ears. Despotic government is abhorrent to most of us. But we are as much despots in Egypt as we are in India; and circumstances compel us to be such. In India our despotism has had most beneficial results, and the governors and the governed have been alike gainers. One of the last, and certainly one of the best qualified witnesses to the fact was Lord Roberts, when he spoke in the House of Lords on July 20 of last year, on the subject, and he gave the reason. "The extraordinary position we occupy in India is mainly due to the native's firm reliance on our integrity and honesty of purpose, and on our determination to do what is right and best for them." If a Government must be despotic, as is practically necessary in the East, it is essential that he or those who wield the power should be known, so that there should be no shirking of responsibility. An unknown and irresponsible despot may well create terror and do endless mischief without being brought to account. This is the case in Egypt. The Government is despotic, but the despot has taken such pains to hide himself behind forms and buffers,

that it is generally impossible to get at him. In theory the Government is carried on by the Khedive on the advice of his Council of Ministers. The Khedive, with youthful ingenuousness, has occasionally tried to act on the theory, with results that are too well known. The British Administration takes advantage of it when they wish to screen themselves from the responsibility of any conduct that may be considered odious or objectionable. On a recent occasion all the relatives, including the Khedive himself, and all the old friends of Ismail Pasha, and certainly the majority of the Egyptians, were extremely anxious that the ex-Khedive Ismail might be allowed to return to his own country to die. Whatever his faults and extravagances may have been, he was the originator of nearly all the new improvements from which Egypt is now deriving so much benefit, and he had done more than any preceding ruler to introduce into his country European civilisation, and to let the country reap the advantages of European, and especially English, machinery. He had suffered severely by sixteen years of banishment, and but a short time ago it was known to himself and his family and the British authorities, that his life could not possibly last for many months. These few months, he who had spent the first fifty years of his life in Egypt wished most naturally to pass in his native land. He was refused. Great Britain was the despot who refused, but probably, being ashamed of her action, the form she put it in was in an announcement through the press that the "Council of Ministers saw grave objection to the return of Ismail Pasha." What power, it may well be asked, have the Council of Ministers? The answer is, "None." The power lay entirely with this country. Many illustrations may be given of this, but I will give only one.

Not very long ago a request was made to the representatives of Great Britain with regard to a certain distinguished individual. Before the request was answered, the representatives referred the matter to the Foreign Office at home. The Foreign Office replied that it was not a case for Great Britain to interfere in, and that the Egyptian Government might deal with the case as they thought proper. The matter was then taken to the Egyptian so-called Prime Minister. He at once said that he had no power to act without consulting the representative of Great Britain. He was told that the British Government had decided not to interfere with the Egyptian Government, but to let them do what they thought proper. "Yes," said he, "but what is the Egyptian Government?" "The Khedive and his Council," was the reply. "Not a bit of it," said the humorous so-called Prime Minister. "It is Lord Cromer, Lord Cromer, Lord Cromer." "Besides," he added, "the British Financial adviser has cautioned me and told me not

to commit myself, as the matter you refer to is not in my province."

The so-called Prime Minister was wrong in mentioning so emphatically three times the name of Lord Cromer, but Easterns judge from what they see, and to him Lord Cromer is the embodiment of British power. The real name should have been that of Great Britain, which is first shaded from view by the Foreign Office, then by the British Consul-General, and by the British advisers and a host of other minor officials.

This hide-and-seek kind of despotism, under which it is impossible to find the despot when he does anything of which he is particularly ashamed, is the worst of all forms of government, and yet it is the one this country is carrying on in Egypt at the present time. It naturally produces uncertainty and want of continuity of policy—grave defects in the management of a country. Foreigners in Egypt despise us for it, the French adroitly utilise it for their own purposes whenever opportunity offers, the British officials loathe and detest it, and, though I have no authority for saying so, I am sure no one hates it more than Lord Cromer himself. No minister abroad has ever been more loyal to the Government at home than our present Consul-General at Cairo, but that loyalty must not be construed into an approval of the policy the Home Government has adopted. A study of the blue books alone will show that on several occasions Lord Cromer has often carried out a policy against which he has personally protested, and he has done so rather than increase the difficulties of the Government and the country by resigning. The Government is alone responsible, and Parliament is responsible for the Government; but, unfortunately, Parliament, and especially the House of Commons, is very ignorant of the matters for which it incurs responsibility.

As a matter of fact, this country made a very bad start in the business of occupation in 1882. The sooner this is recognised the better. The absurd and Quixotic speeches then made by ministers with regard to the occupation have had their natural effect. They have hampered every succeeding Government. They were probably made for party purposes, but, whatever their object, the impression they left was that the occupation would be of short duration. It was only to last for the brief period that was necessary to teach the Egyptians the easy art of self-government. To the ordinary Radical in France or England this would mean a few months, or at most a few years. To serious statesmen it was nonsense. Nobody was more hampered by these ridiculous speeches than was Lord Salisbury when he took office in 1885, and again in 1886, but he never attempted to evade the engagements made or implied in them. He made an honest and straightforward attempt to carry them out in

the Drummond-Wolff Convention. The French are entirely responsible for the abortiveness of that convention; in so far as Great Britain is concerned, we are clear from any responsibilities that might have been imposed by the reckless and silly speeches of 1882. The responsibilities and engagements of this country with regard to Egypt now rest upon official documents and diplomatic engagements, and they are exactly the same as those under which France lies with regard to Tunis. A study of the blue and yellow books in which these are contained and of a correspondence which has recently taken place between a Frenchman of high authority and a gentleman who has been a twenty years' resident in Egypt will prove this.

It may not be flattering to one's self love to be asked to copy the French, but no fair-minded person can deny that the conduct of France with regard to Tunis has been much more dignified than that of Great Britain with regard to Egypt. No French orators have indulged in the hypocritical whines which have been heard on this side the Channel of the benefits bestowed by their unselfish action and of the ingratitude of the benighted Tunisians. I doubt very much whether they have conferred anything like the benefits on the Tunisians that we have on the Egyptians, but what they have done they have done openly and above board, and they have let the world know that they intend to remain where they are for such a time that French capitalists are not afraid of investing their money in the country.

Our action has been on the exact opposite lines. Everything is done by stealth. We appear ashamed even of our good works. The result is that nobody trusts us, and British capital is scared out of the land. What is wanted is a decision—are we going to stay, or are we going to scuttle?

In my opinion, the latter policy is impossible. There might have been some question in 1882, whether it was the interest of this country to interfere or not. There were doubtless arguments on both sides, though I think those for interference far out-weighed those for non-interference; but having once decided on interference, I do not see any way out of accepting all the consequences of that interference. One of these consequences is to act like the French are acting in Tunis, and show that it is certain we shall not quit the country for the next half century at least. If this were accepted as a fact, nearly all the French and Egyptian intrigues would cease, and certainly British capital would be invested for the mutual benefit of Great Britain and Egypt. The Egyptians would then willingly work with us. They cannot be expected to work with us now when they are in constant expectation of our leaving, and being left to the revenge of those who may be our successors.

It would not be necessary to proclaim a protectorate. The present system is called euphemistically "a veiled protectorate." In fact it is a protectorate, whatever name people may choose to call it. The important point is, whether it is to continue for two or three or for fifty years. Our words induce people to believe that it will last for the shorter period, but acts show that we intend it to last for the longer period. Is it astonishing that the Easterns are confused and the French irritated? Twelve years ago the French practically gave us a free hand to pursue our own course in Egypt and the Soudan by relinquishing voluntarily the dual control which for some few years they had exercised with Great Britain. It was only when they saw that the British Government was afraid of its own shadow and had not the courage to act as they themselves were doing in Tunis, that they commenced that series of petty intrigues and annoyance which have since given so much trouble. So long as they see the same timid hesitation they will pursue the same tactics; and it is impossible to blame them for it. Delay on our part in acting energetically is all in their favour. Our reckless abandonment of the Soudan has raised hopes in their minds that they may become possessed of Khartoum. If they did Cairo would be at their mercy. When the late Sir Samuel Baker urged this point upon those responsible for the government of Egypt and the Soudan they ridiculed the idea and acted in defiance of it. These very individuals would now admit that the highest authority on the subject is Sir Colin Scott Moncreiff. The following are the words he used on the 25th of January last, at the Royal Institute, in his lecture on "The Nile."

"A civilised nation on the Upper Nile would build regulating sluices across the outlet of the Victoria-Nyanza, and control that great sea as Manchester controlled Thirlmere. This would probably be an easy operation. Once dam the Nile, supply would be in their hands; and if poor little Egypt had the bad luck to be at war with this people in the upper waters, they might flood Egypt or cut off its water supply at pleasure. Was it not evident that the Nile, from the Victoria-Nyanza to the Mediterranean, should be under our rule?"

It was Great Britain that deliberately, eleven years ago, forced "poor little Egypt" into this position of danger. If there be such a thing as international duty, it is as clear as the sun at noonday that it is Great Britain's duty at once to place the country she pretends to befriend in as secure a position as she found it. It is not a party matter. It should be faced in Parliament, and no information should be withheld, and a policy at once intelligible and continuous should be decided on. Great Britain should act in Egypt as she has done in India. Her action should be firm and just.

W. T. MARRIOTT.

THE LIBERAL PARTY AND ITS CANDID FRIENDS.

IN a well-known passage of his *Provincial Letters*, Pascal compares the condition of the Gallican church in his day to that of a traveller who falls among thieves, and, being grievously wounded, sends for the three leading physicians of the neighbouring towns. The first probes his wounds, finds them very serious, and advises him that in the help of the Almighty lies his only hope. The second, coming up shortly after, tells him that, on the contrary, he has quite strength enough left to carry him home, loads the first with abuse, and resolves to destroy his professional reputation. The sick man, distracted between them, turns in the greatest anxiety to the third, who takes the part of the second, and with his help drives away the first. "How do you find me?" then says the patient; "have I strength enough to move alone?" "Certainly not," replies the third doctor, "you will never be able to walk properly unless God sends you some extraordinary means." "What, sir!" cries the unhappy sufferer, "you are not, then, of the same opinion as your friend here as to my real condition?" "I confess I am not," replies the wiseacre. We are then told that the sick man was unreasonable enough to complain of the ambiguous proceedings of the third doctor, gets rid of him and his friend, recalls the first, confesses to Heaven his lack of strength, and then with the divine succour is carried safely home. Though not quite in so sorry a condition as Pascal's traveller, the Liberal party at the present moment is, we are assured by many of its advisers, rather out of sorts, and requires very careful nursing; and some of its friends are pointing out to it the treatment it should adopt to make it as strong as ever it was. Unfortunately the treatment varies with the physician.

On the other hand, the party has its cheery medics who tell it that there is nothing at all the matter with it; that it must keep up its spirits; and that, in spite of the few slight shocks it has sustained, there is no reason why it should not live on with undiminished salaries, and return from the country, when it elects to take that bracing change, to enjoy a renewed lease of official life. Meanwhile its opponents stand round rejoicing at the spectacle, poking fun now at this doctor, now at that, and not caring to conceal their opinion that they can thrash it soundly in its present demoralised condition whenever it plucks up spirit enough to join battle.

It cannot be denied by the staunchest Liberal that the unregenerate are entitled to their laugh. The amateur doctor is only

NOTES OF RESEARCH

ON

THE

NEW

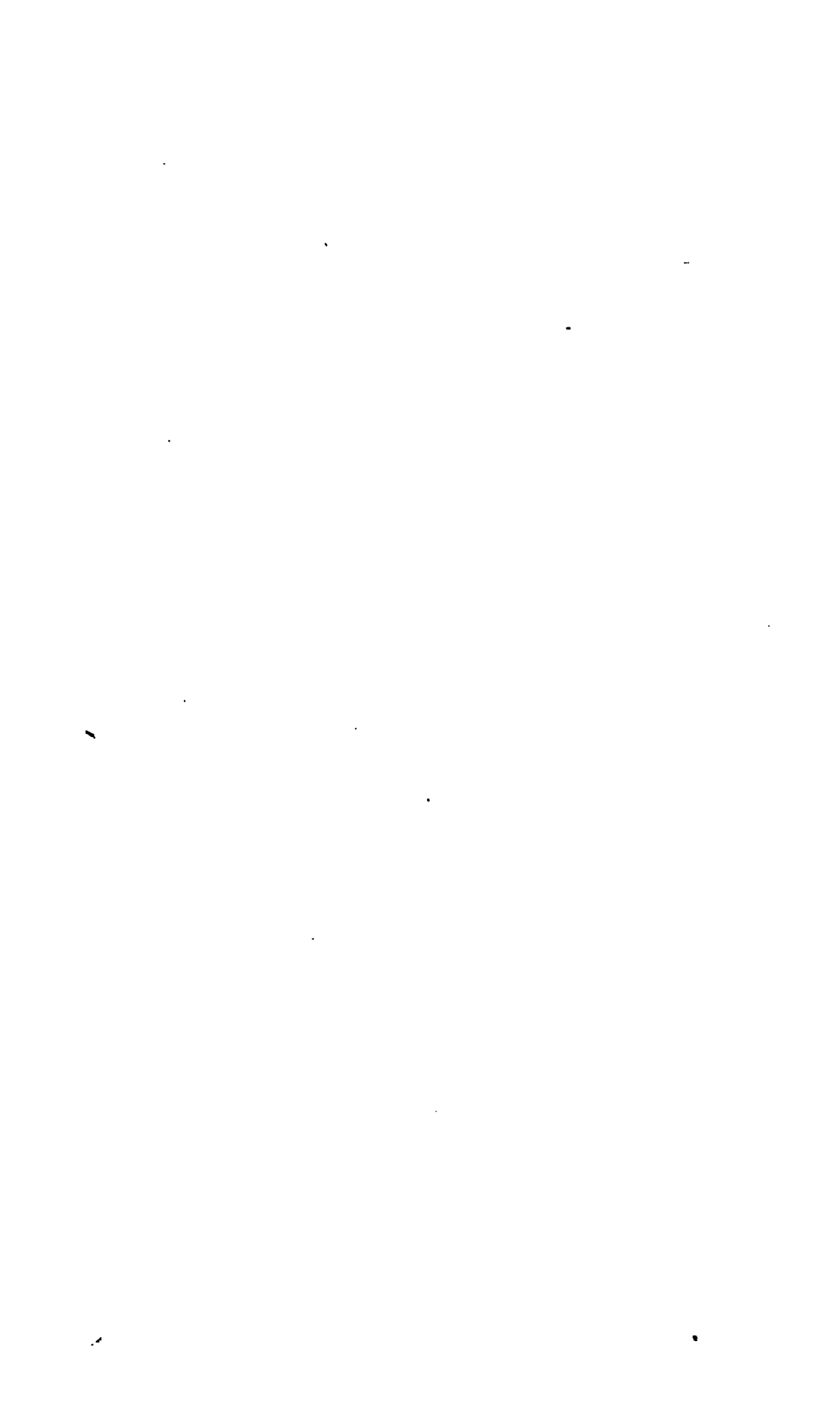
YORK



OBELISK,

BY

ALEXIS A. JULIEN.



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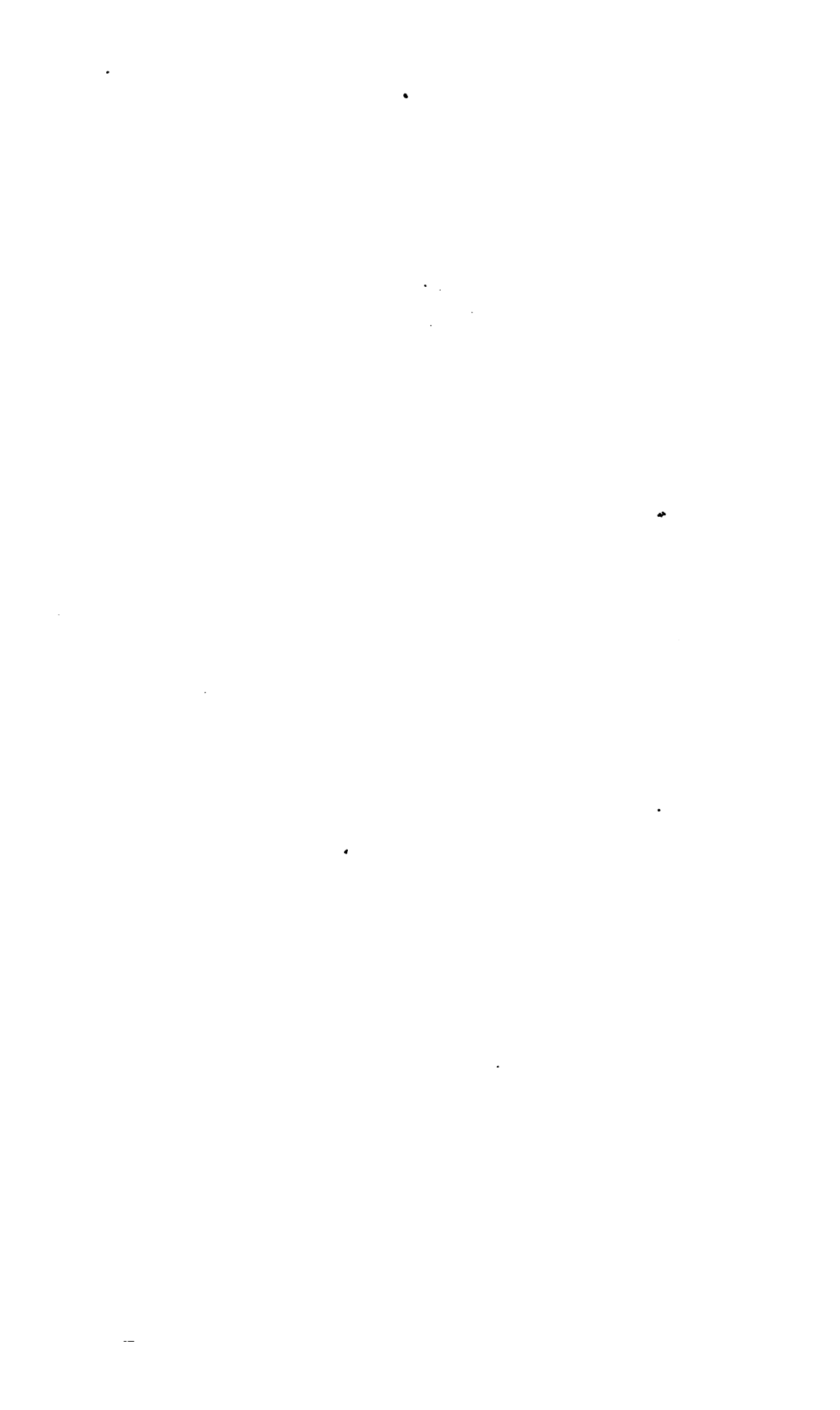
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OBELISK,

BY

ALEXIS A. JULIEN.



PREFACE.

The following reprints of recent papers on the Egyptian Obelisk in Central Park, New York City, are presented in this form, with the special object of interesting you in behalf of the proper completion of this monument—the restoration of its ancient gilding and splendor, as Symbol of the Sun-Beam. The question of its permanent preservation may be considered settled, at least for centuries to come, by the renewal and deepening, during the summer of 1893, of the preservative process (application of melted paraffin) over those spots most injured during the unfortunate exposure of the Obelisk without protection from the weather, from 1881 to 1885. The restorations now proposed consist of two parts.

1. A gilded metallic cap, to cover the upper part of the pyramidion. The Park Commissioners have already placed a zinc cap, coated with a film of gold-leaf, unburnished. This cap is perishable and temporary, and cannot be expected to last but a few years. A cap of some durable metal will then be needed in its place, probably aluminium, well plated with gold and burnished.

2. The re-gilding of the hieroglyphs, so far as they remain distinct, over the lower part of the pyramidion and down the four faces of the shaft. This will require the application of four coats of gold-leaf (not to the whole surface of the Obelisk but only to these characters) and thorough burnishing.

A copper lightning-rod, connecting the metal-cap with the ground, would be also an advisable precaution.

The Obelisk was presented by the Khédives of Egypt as a free gift to the City of New York. It was removed and again re-erected at the expense (over \$100,000) of a single liberal citizen, the late Mr. William H. Vanderbilt. We may now naturally look to other citizens of our city to supply the small sum (less than \$3,000) yet needed to complete the restoration. New York, however, holds this unique monument virtually as a trust for the whole Western Continent, and, throughout its most remote and wildest regions, this ancient Obelisk is known and its mysterious influence appreciated. From some friend, the gift will come, which will restore the beauty of the once brilliant emblem, and link a second generous name with the most enduring of all human memorials.

A. A. J.

COLUMBIA COLLEGE, NOV. 1, 1893.

THE MISFORTUNES OF AN OBELISK.

BY ALEXIS A. JULIEN, PH.D.

REPRINT FROM THE BULLETIN OF THE AMERICAN GEOGRAPHICAL SOCIETY
FOR MARCH, 1893.

THE MISFORTUNES OF AN OBELISK.*

BY

ALEXIS A. JULIEN, PH.D.

It is not as a traveller that I come before you, but, by proxy, in behalf of a traveller, an aged traveller, who, after a journey of some five thousand miles—carried on somewhat leisurely, in truth, since it covered a trifle over thirty-five centuries—has lately settled down, within our quiet borders, in the hope of a little repose. By a part of our citizens the strange newcomer upon the knoll in our Park, from its arrival in 1881 even until now, has been looked at askance. For wanderers from every clime, there was room within the Park wall :

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for shrubs and flowers of every form and hue ; for exquisite carved work in soft freestone, daily rotting into sand ; for apes and costly hippopotami ; but as for an Obelisk !

I come indeed to plead the cause of a priceless monument in danger, which was put in the keeping

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of New York twelve years ago. If once convinced of the danger, the influence and efforts of the intelligent citizens of New York, and of its responsible officials, will surely be exerted to save the name of our fair city from the certain disrepute, or disgrace, which will follow any neglect of such an accepted trust. The public

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interest in this monument has not waned, I am sure, outside of this city. A few weeks ago, a friend from a country village, on a hurried visit to New York, wished to be shown first our two surpassing attractions, in his eyes, "the Brooklyn Bridge and the *Pyramid!*" Of course he was assured that if our merchants undertook to import a pyramid, that pyramid would have to come; but up to this time only an Obelisk had arrived.

With that ancient Egyptian Obelisk, for the last nineteen centuries in Alexandria, which now looms up with surprise in the midst of our modern city, you are all doubtless familiar. You have heard of crumbling decay which threatened its sculptured surface until eight years ago—of the water-proofing process then applied—of the appointment, in 1889, of a Committee of Experts by our Commissioners of the Public Parks, to examine the Obelisk, and their unanimous report that the process had been found so entirely satisfactory in stopping all visible decay over the general surface, that it would be wise to deepen its action in certain cracked spots by a new mode of application, whose details were worked out by a second Committee in July, 1890. Let us then ask to-night, is this ancient relic worth to us the constant attention, watchful care, and a certain amount of expense involved in its protection? Is it of any real value to the City of New York?

I will offer a few thoughts—in part, gathered from the works of Goringe, Moldenke and others—on the *significant idea* of the Obelisk, with examples from nature, prehistoric monuments, and early records in Asia and Europe: a brief history of our own peripatetic monolith until it swam over the sea to its present site,

in 1881 : our entire neglect of it and its rapid decline, until 1885 : and the steps since taken, or left undone, for its protection from our fierce climate.

1. *Natural Obelisks.* First, consider some strange forms in natural scenery, towering rock shapes, hewn by the lifeless forces which spring from the Sun. Through the very ravages caused by its rays, the Sun becomes a builder, an excavator, a sculptor of wonderful outlines in stone. Here, on some broad plain, as in Colorado, he calls the winds out of the Ocean of Air as his stone-cutters, whirling along the keenedged sand-grains as tools, biting into the cliffs of sandstone or limestone, and scooping them out into curious domes, castles, turrets, and slender spires of rock, like the Cleopatra's needle in the Garden of the Gods, Colorado—all carved by the force of the Sun. Elsewhere the bosom of the Sea is lashed into billows, which hurl themselves in thundering surf upon the breasts of rocky coasts. There the Sun-force sculptures walls and piers, arches and lofty columns, such as the Stacks of Duncansoy, in Scotland. Or again, gently and silently, by the trickling rain-drops, which the Sun has lifted high as vapor and then let fall, and by fierce heat of summer rays, and by prying of winter frost, which is but the recoil of a spring long compressed by solar force, the same Patient Sculptor quietly loosens and undermines and picks away a mountain-wall into tall pillared forms, like the Cleopatra's Needle at Devil's Lake, Wisconsin. All over the earth, great stone fingers are thus left, pointing meaningly upward at the falling darts of the one Vast Force in nature, the blazing orb which has carved out these, the most ancient and stupendous of Sun Obelisks.

2. *Prehistoric Obelisks.* It is not strange that these weird forms were early imitated by man, especially near rocky coasts along which such natural pillars abound, as those of Brittany. There colossal rude pillars of stone, like those at Carnac (Morbihan),* were set up by prehistoric races, of whose times and of whose very names we have now little or no record. Sometimes these were solitary columns, like the Standing Stones of Dunbar and Lundin Links, in Scotland. Or these were massed in rows which stretched over the land for miles like the *menhir* of Brittany. Or we find them, perhaps, lifting their heads in clusters, like the lonely groups in Sweden and at Stennis and those among the desolate mountains of the island of Arran, off the west coast of Scotland. Or the same Standing Stones meet our view in the significant arrangement of a ring like the disc of the Sun, such as the so-called Druidical circle at Callernish, on the island of Lewis. Or it may be, in some solitary dell in Asia Minor, there stands a circle, about which the peasants tell the tale of the wrath of an enchanter of old, who, as a wedding party merrily crossed the plain, turned them suddenly into stone; and there they stand—is it sadly or gladly? bride and bridegroom and all—a petrified honeymoon for a thousand years, without a cross word! In most cases, a great stone shaft rises in lonely grandeur in the middle of some broad plain, like the standing stone at Loch Eynert, the primitive form rudely hewn but impressive, of the Obelisk of Prehistoric Time. Its meaning, to the ancient people who set it up, is now but a subject for conjecture. Is it only a fancy, that,

* Miln, *op. cit.*, 199.

gilded or reddened by the blush of dawn, this glittering column of crystalline granite suggested to the human mind, even then, a fitting and cheery emblem of the first beam which shot up from the glorious disc, rising



STONE AT LOCH EYNERT, SCOTLAND.

from the horizon, which, from earliest times, as a symbol of Almighty Power, has received the adoration of our race?

That these rude stones were indeed Obelisks appears to be confirmed by the common application of that term to them by early travellers in Scotland, Thos. Pen-

nant, Brand, etc., and by the surviving reverence of the peasantry toward them, through Saxon and Danish down to Christian times. A curious example of this was found in the Obelisk at Ruthwell, a square shaft about 20 feet in height, and 18 by 16 inches at the bottom, but in three pieces, "broken by an order of General Assembly in 1851, under pretence of its being an object of superstition among the vulgar."*

3. *Prehistoric Tumuli.* But often, not far away from the upright menhir, another low object catches the eye, which suggests sorrow and loss. It may be a natural hummock or cone of earth, which tells where the trunk or stump of some great tree has crumbled away into dust. It may be a low mound or barrow or cairn, under which the bones of a slain warrior are entombed. Or it may swell into a broadly based, conical tumulus, fifty or even a hundred feet in height, beneath which a viking lies at rest.

These two are the monuments, roughly shaped, of the prehistoric races; the one, an upright column of stone, bright like the sun-ray, suggesting light, birth, life, hope; the other, a cone-shaped gray mound, speaking of sadness and death. Sometimes we find even the rude column surmounting the mound, like the "bauta-stone" upon the barrow, near Gödestad in Halland.†

4. *Distinction of Stelæ.* We may here, in passing, refer to the more carefully hewn pillar of early historic age, which has been often called an obelisk, by Rawlinson and others, but is better distinguished by the Greek name of *stela* – an upright rectangular slab with

* Pennant; see Pinkerton, *op. cit.*, III., 213.

† Montelius, *op. cit.*, 208.

rounded summit, such as the stela of black basalt from Nimrūd* in Assyria, set up, it may be, as a record of victory, for an epitaph, or as a kind of monumental placard. Such too is the Assyrian stela of black marble, erected by Shalmaneser II., covered with figures in



STELA AT AXUM.

triumphant procession. Sometimes it became dedicated to the king of the nation, vicegerent of the deity upon earth, like the stela, adorned with the sculptured form of King Samas-Vul II. of Assyria: a record, as Defoe puts it, of "the divine right to govern wrong." The most ancient example known is perhaps the round topped stela of Begig, in the Fayoum, Lower Egypt, erected

* Rawlinson, *Five Great Monarchies*, I., 266.

by Osirtasen I., 45 centuries ago. One of the least known, and of undetermined origin, is the lofty stela discovered by Viscount Valentia, in 1806, at Axum, in Abyssinia, a granite monolith, 80 feet in height.* Other pillars stand, as solitary decorations, in the middle of courts of ancient palaces, like the Assyrian stela in the palace at Khorsabad,† the half-sunken, shrine-crowned pillar of Cashmere, the serpent column of Constantinople, or the great column of wrought iron at Delhi, the Masjíd-I-Kutb ul-Islám, now over twenty feet in height, whose lower part is buried in the soil to at least the depth of forty feet.‡ Others have been raised as memorial monuments to great and beloved citizens, like the curious triangular pillar of white marble, to C. Cassius Philiscus, found by an old traveller, at Nice, in Asia Minor.§ On a smaller scale, in modern times, the obeliscoid form has been commonly devoted to the honor of the dead, like that which stands on a knoll in Rockland Cemetery, where lies asleep he who brought over to us our Obelisk from Alexandria, Lt. Commander Gorringe.

All these stelæ, however, with the upright tablets raised for more commonplace uses, to mark boundaries, goal-posts, mile-stones, etc., have been but secondary forms of use, examples of divergence, to lower objects, from the prominent design of upright stone monoliths in prehistoric times.

Even by the sun-loving Assyrian and Greek, the

* Valentia, *op. cit.*, III., 87, and De Cosson, *op. cit.* I. ch. 11.

† Perrot et Chipiez, *op. cit.*, I. 257.

‡ Cole, *op. cit.*, Pl. I.

§ Pococke, *op. cit.*, II., Pt. II., 123.

noble thought of the Egyptian seems to have been imperfectly understood. The Greek amused himself by applying, to the slender pointed shaft of the Nile valley, the nickname, *οβελίσκος* (a little skewer or spit); but, like many another nickname, this has become a designation of honor.

In Egypt, from the very beginning, the Obelisk was adopted as the symbol of a lovely thought—the pledge of the sunbeam as a gift of life and coming immortality from a Kindly Power, a message of dedication to the symbol of that Power, the most majestic object in nature—(as Whitman calls it) “the splendid silent Sun!” This continues to be to us too, of the Nineteenth Century A.D., of the most fascinating interest, since we definitely know that, from that vast source of light and force come the sigh of every breeze, the roar of the gale, both ripple and storm billow of ocean, every thrill of nerve and swell of muscle, every stroke of wing or fin, every form and phase of life, voice, thought, existence itself!

5. *The Sun in Egyptian Mythology.* This view of the all important relationship of the Sun to man is no novel conception of our own time, science or theology. You will allow me to review briefly some well established facts. The men of earliest history, nowhere more clearly than on the sunny banks of the Nile, felt the same dependence on that brilliant fountain of life and light and joy. Listen to a part of the prayer of Queen Nefer-i-Thi, in the year 1466 B.C.

“Thou Disc of the Sun, Thou Living God! There is none other beside Thee! Thou givest health to the eyes through Thy beams, Creator of all beings. Thou

goest up on the eastern horizon of the heaven, to dispense life to all which Thou hast created : to man, four-footed beasts, birds, and all manner of creeping things on the earth, where they live. Thus they behold Thee, and they go to sleep when Thou goest down. Grant to Thy Son who loves Thee, life in truth : to the Lord of the land, that He may live united with Thee in eternity." *

At the basis of all ancient faiths, the single visible Sun became the natural symbol of the Single Invisible Deity, Amen-Ra, the Hidden One, King of the Gods, with the life symbol in His right hand. All other superior gods of Egypt were but emanations from Himself, and in all cases assumed the addition Ra to their proper names. Thus the Divine vengeance was indicated as another deity with head of crocodile, Sevek-Ra : the Divine spirit, Knum-Ra : the Creative energy, Khepe-ra: the height and depth and omniscience of the Divine Mind, as the hawk-headed Sun-God of Morning and High Noon, Ra or Phre of Memphis, with the head of the bird of loftiest flight in Egypt, the sparrow hawk (like our own eagle), with its keen sight, and soaring and plunging course through the air. All the gods were gods of the Sun.

But with the Sun's daily passing to and fro, and the cheering or depressing effect of his reappearing and disappearing on men's hearts, another phase of the worship of Ra was connected. At the sun-setting, gilding the placid bosom of the Nile, they looked sadly, as at the departure of a friend, but with hope for his speedy return. Sunrise they hailed as fulfilment of their hope, while the hateful darkness fled away. So in the holy

* Brugsch, *op. cit.*, I., 450.

City of the Sun, An or Heliopolis, in Lower Egypt, with the first flight of the sparrow-hawk at dawn arose the glad hymn to Ra-Hor-Khuti, the Rising Sun, the Guardian of the Upper World. At eve, the solemn chant floated over the river to Atum-Ra, or Tum, the Setting Sun, just about starting westward under the stars of night, on his dangerous voyage through the Lower World, till, in the East, the morning came again. In this cloudless Nile-land, bathed in never ending sunlight, we find a cheerful and contented people, to whom life was a delight and but too short, the earth a glad-some place they were loath to leave. What wonder they paid their vows to the visible symbol of Ra, whose every ray bore in a friendly hand the gift of *life* to King and Queen and to all their people. Their deepest hope lay in its renewal and eternal continuance, and therefore in the preservation of their bodies for the coming resurrection of Osiris. For their worship was that of the Sunbeam—the token of all that was brightest in human life and hope.

6. *Obelisk and Pyramid.* What more fitting emblem of this idea could the Egyptian set up—what more worthy of our sympathy and reverence—than the Obelisk—a towering shaft of ruddy stone, like the first beam of rosy light which flashes up from the daybreak? This too is the birth, the first suggestion of the Cathedral Spire. Out under the open sky, therefore, should the old monolith fitly stand for all time, to tell us this story.

While the Obelisk thus sprang up significantly on the east side of the Nile—such as that of An—on the side of the Rising Sun, far away to the west, however, and

only there, amid rock-cut cemeteries and subterranean sepulchres, you see the Pyramid, solitary and independent, the solemn emblem of the Sun after its Setting, the midnight Sun of the under-world, the type of death and darkness and the grave, enclosing the mummy of some mighty king. We find here the same contrast as in the prehistoric monuments: the Standing Stone or Menhir has developed into the more shapely hewn and polished Obelisk: the burial Tumulus, the Pyramid. And yet, to the Egyptian mind, Life and Death, they are but one; on the summit of the Obelisk is the sacred crown, the Ben-ben or pyramidion. In fact, like the "bauta-stone" on the tumulus, there are very early instances of an obelisk surmounting a pyramid.

7. *Origin of the Obelisk in Egypt.* A link yet remains missing in the chain of my argument. If both menhir and hewn column have sprung from an idea first suggested by natural, sun-carved rock-needles, scattered over the face of the earth, where in the Nile Valley did the home-loving Egyptian first catch the suggestion of the Obelisk? I would submit to your consideration, that this locality, this birth-place of the obelisk idea in Egypt, was at its extreme southern boundary, under the line of the Tropic, on the Nubia frontier. There on the upper Nile, stood the old city of Sun-t, "allowing the entrance" (as the Egyptian called it), Syené (the Greeks), or Assouan (the present Arabs). Farther north was the site of Thebes, with the temples of Karnak and Luxor, 136 miles below. Still farther down the Nile, we now see Cairo, with the pyramids of Gizeh and the site of An, 560 miles below; and there, Alexandria, on the sea-coast, over 700 miles below.

At Sun-t, a vast rib of red hornblendic granite, (much like our red Nova Scotia granite), juts out from the desolate ranges of the Libyan desert in a belt of remarkably wild and picturesque scenery ; in crossing the Nile, it breaks it up into the famous First Cataract. From the earliest ages and in classic times, as the writings of Seneca and Cicero record, this rugged region had a frightful renown, particularly from the reports of the terrible roar of the waterfall, by which all the inhabitants for miles around were made as deaf as the stones themselves. It was famed also for its "shadowless well," and the locality where, at noon, on the longest day of the year, you might look down at your feet and find that you cast no shadow.

As late as 1714 A.D. came the traveller, Paul Lucas, who, in accounts of former voyages, had announced to the geographers of Europe that, with his own eyes, he had seen giants leaping up the peaks of Thëssaly like the steps of a staircase : one-legged men who ran with amazing swiftness : and, at an interview in the desert, the hermetic philosopher Nicolas Flanel and his wife Pernelle, although certainly three centuries after their death.* After his return home from his visit to Syené, he gravely related to Louis XIV. that the waterfalls there fell at several places from a mountain over 200 feet in height, with one sheet thirty feet wide, behind which visitors might pass without wetting themselves ; he also repeated the marvellous story of the Land of the Deaf ; all of which, with the deference properly due to a man of science, was swallowed by the Grand Monarque.

The travellers who have succeeded him, however,

* Champollion-Figeac, *op. cit.*, article " Syene."

unite in enthusiastic description of the wild grandeur of the scenery along the river, in ascending the cataract, mainly due to the vertical clefts which seam the granite walls, as in the well-known rock of Abousir. In the year 1802, the traveller Denon, with the great French Expedition under Napoleon, vividly describes the scenery near the First Cataract, and gives a view, in the desert, of the picturesque Two Mountains, the Djebelein, in which the columnar structure of the granite, throughout this region, is well shown. The sketches of Gau* also illustrate the same vertical fissures, in his views around the First Cataract and farther up, toward the Nubian boundary. Freeman has already observed: "The birthplace of Egyptian architecture is certainly to be looked for in the rock excavations of Nubia, which stretch from the frontier of Egypt as far as the ancient Meroë." †

Concerning this upper part of the Nile, Villiers Stuart writes: "We left pretty Maratta behind us, borne quickly along by the seething waters, and were presently amidst the castellated piles of granite boulders, so well known to all who have visited Nubia."

It is now that we approach the point, after ascending the Nile above the First Cataract, about nine miles above Syené, the island of Aareq't, "the island of ceasing," or Philæ, of which Stuart says: "Just above the cataract, at a point where the Nile takes its course through enormous piles of black granite boulders, its romantic temples and palm groves lie imbedded like a fairy scene amid the surrounding desolation." ‡

* Gau, *op. cit.*, Pl. I.

† Hist. of Arch., 81.

‡ Stuart, Nile Gleanings, 201.

This was, you will remember, to the ancient world, the most astonishing spot upon the surface of the earth : a fitting place, as we might anticipate, for the birth of one of the world's wonders. To the Egyptian, this region of almost unearthly wildness, was the burial place of Osiris, the true Source of the Nile, the natural holy shrine of Isis herself, for pilgrimage of king, philosopher and priest : where no Egyptian offered to go without express and rare permission, over which no bird dared to fly, by which no fish ventured to swim.

Here, in 1743, came a reliable English traveller, who gives this description : "The rocks here are very high, on which the antient Syené was built. . . . Some of them are in the manner Strabo describes : a rock standing up like a pillar, and a large rock on it, hieroglyphics being cut on some of them. . . . Returning I took a view " (*i. e.*, made a rough sketch) "of some extraordinary high rocks in a regular figure, as represented in the 50th plate ; on them are cut hieroglyphical inscriptions and figures of men and they directly face the north end of the isle."* In the year 1755, the place was visited by a Captain of the Danish navy, and he gives us a view of the same Island of Philæ, from the upper end of the Cataract, with a better drawing of the same lofty mass of columnar rocks, represented on the right.† In his travels, in 1863, Mr. Hoskins observes concerning Philæ : "Few views in the world can rival the one from this, the west side of the great Temple. There may be finer granite rocks in other lands, but where will you find them equally bold and

* Pococke, *op. cit.*, I., 121.

† Norden, *op. cit.*, Atlas, Pl. CXXXVI.

picturesque in their form? Rhomboidal masses, piled one upon another, some of them looking as if they only wanted a wind strong enough to hurl them into the river, combined with palm and acacia trees. . . .

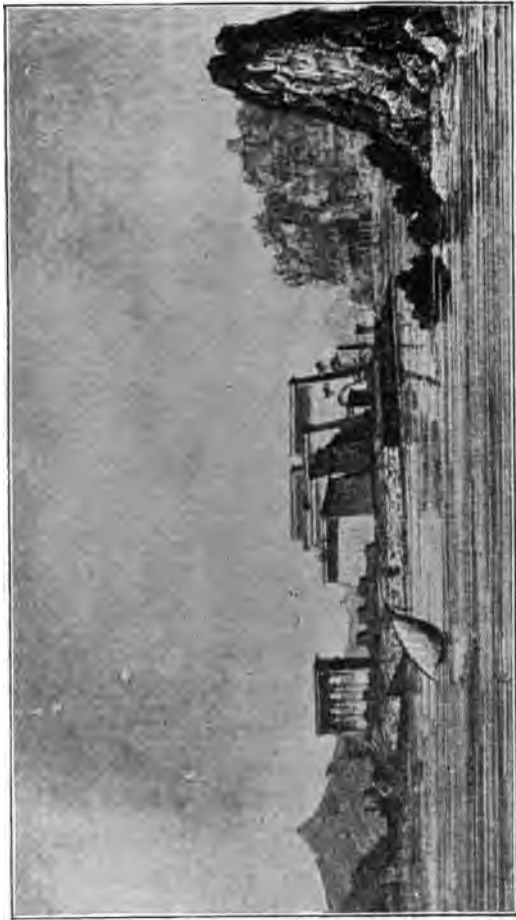
To the right, are three picturesque columnar rocks, covered with tablets of hieroglyphics." * This remarkable column I illustrate from an old drawing.† Again, Bartlett gives us a picture of the approach to Philæ from the north, including the same lofty granite column, on the right. Through all these drawings rough sketches or, it may be, somewhat idealized, the same prominent feature is constantly shown. Such a view is better than a photograph, in one respect; for we need to be impressionists, for our present purpose, and, from the influence of this scenery on modern travellers, form some idea of that produced on the still more impressible mind of the ancient Egyptian. The same wonder and enthusiasm are expressed by the late Miss Amelia B. Edwards, in her description of the view from Philæ :

"Perhaps the most entirely curious and unaccustomed features in all this scene are the mountains. . . . Other mountains are homogeneous and thrust themselves up from below in masses suggestive of primitive disruption and upheaval. These seem to lie upon the surface, foundationless; rock loosely piled on rock, boulder on boulder; like stupendous cairns, the work of demi-gods and giants. Here and there, on shelf or summit, a huge rounded mass, many tons in weight, hangs poised capriciously. . . . But the most amazing of all is a natural monolith on the east

* Hoskins, *op. cit.*, 295.

† Champollion-Figeac, *op. cit.*, Pl. 78.

bank, down by the water's edge opposite, near the carob-trees and the ferry. . . . Though but a sin-



PILLARED ROCK, OPPOSITE NORTH END OF PHILAE.

gle block of orange-red granite, it looks like three ; and the Arabs, seeing in it some fancied resemblance to an arm-chair, call it 'Pharaoh's Throne.' Rounded and polished by primeval floods, and emblazoned with royal

cartouches of extraordinary size, it seems to have attracted the attention of pilgrims in all ages. Kings, conquerors, priests, travellers have covered it with records of victories, of religious festivals, of prayers and offerings and acts of adoration. Some of these are older by a thousand years, and more, than the temples on the island opposite."* Here, therefore, at Philæ, I think, was the birth-place of the very idea of the Obelisk. To this huge natural shaft, Pharaoh's Throne, and the numberless upright pillars of granite which loomed up around and above the First Cataract, the Egyptian mind probably owed its first impression of that which was to become an imposing feature of the national architecture.

8. *Granite Quarries at Syené.* The invariable source of the material for the obelisks was found very early in excavations a little below the Cataract at Sun-t or Syené, which developed into the famous quarries, probably the most ancient in the world. These yielded the bright colored and durable stone suitable for a representation of the sunbeam; the rose-colored granite, "machet" or "heart-stone," as the Egyptians called it. With chisels of copper, and perhaps of iron, and copper saws fed with sand or corundum, the old quarrymen managed to cut long series of shallow holes along every quarry-face, now left as rows of wedge-marks along the ledges. In these holes, some think, wooden wedges were tightly driven, whose swelling, after wetting with water, caused the splitting away of the selected block. According to another view metal wedges were inserted in the holes, as now in our own

* Edwards, *op. cit.*, 231.

quarries, whose continuous beating from one end toward the other, at one time, by great gangs of workmen, caused the stone to part.

You are probably aware, through the public journals, that the State of Wisconsin has just flung defiance to Ancient Egypt in the production, for the Columbian Exposition at Chicago, of a monolith obelisk, 115 feet high, 10 by 10 feet at the base, and 4 by 4 at the top. This is indeed $9\frac{1}{2}$ feet taller than the Lateran obelisk at Rome, the highest Egyptian obelisk which happens now to be standing. With five steam channellers, it was cut out, at the Prentice Brown-stone Quarries, in three months and a half, all but the loosening of the bottom of the stone from its bed. This was accomplished by wedges, and is thus described :

“For this work wedges had been entered, and all that remained to be done was to drive them, upon a given signal, until the rock was wholly separated. Fifty men were carefully selected for this work, and with mauls raised, on November 18, they waited for the signal.

“The word was given at 11 o'clock by President Prentice, of the Prentice Brown-stone Company, who donates the stone to the State of Wisconsin. At the sound of his voice the mauls descended. As each man struck a wedge he stepped forward, from the base to the apex, striking a wedge at each step. The men kept step like soldiers, and the fifty mauls descended as though wielded by one man. The first crack appeared at the base. It gradually widened and spread as the blows continued to descend, until, at last, the entire shaft separated from the ledge. There was a

slight tremble at the moment of complete parting, and there lay the great monolith."

But this stone is, after all, but brown-stone, not granite, and it is simply to be dressed before it is borne to Chicago, in place of the elaborate sculpture in hieroglyphics, polishing and gilding which the intensely hard granite obelisks of Egypt received. The enormous unfinished obelisk, 95 feet long, with a base 11 feet square, which still lies in one of the old quarries of Syené, is over 400,000 pounds heavier than the monolith of the Wild West; it is roughly hewn on three sides, but underneath yet undetached from the rock.

We may gladly remember that there are no associations of oppression or sorrow connected with the construction of the obelisks. It required the most skilled, and therefore willing labor. The words of one thorough Egyptologist, in regard to another class of monuments, may here be recalled :

"It was not an enfeebled race of captives who built the pyramids, groaning under the lash as they toiled, but a youthful and vigorous nation, who, during long centuries of peaceful inactivity, spent their superfluous energy in joyful labor, to accomplish an almost super-human task, under the very eyes of princes whom they revered as divine." *

There is no evidence that the hand of a slave ever rested upon our own Obelisk, except, it may be, in later times, as an emblem of hope and coming deliverance.

9. *Various Egyptian Obelisks.* In regard to the antiquity of the obelisk, there is one record, now nearly

* Ebers, *op. cit.*, I., 139.

5000 years old, showing the obelisk of Khufu, with its attendant priest, in the Fourth dynasty, sixteen centuries before the quarrying of our own obelisk began. In many very old hieroglyphic inscriptions, the symbol of the obelisk (tekhen) stands among the characters, in one inscription within a pyramid. The figures of a pair of obelisks remain sharply cut on two faces of the London Obelisk; and a corresponding pair is recognized, half-effaced, by Dr. Moldenke, on the south side of the New York Obelisk. A similar representation of a pair of obelisks was also found by him on a piece of mummy cloth, a fragment of the Ritual of the Dead.* The oldest obelisk of all, of the IVth or Vth dynasty, about 3000 B.C., was little more than a model, as it was but a little over two feet in height; it was found inside of a tomb at Thebes by Lepsius, and is now in the Berlin Museum. Stuart also has described two others of a small size and simple form, found at Deah Abou'L Neggah, near Thebes, with inscriptions of King Entef of the Eleventh dynasty, about 2400 B.C. But, with these exceptions, all the obelisks occur on the east or morning side of the Nile, where they once stood, always in pairs, before the gates of some temple. However, according to Ebers, small "obelisks bearing the name of the owner were sometimes to be seen near the gates of the Egyptian country-houses."† We owe to Chipiez an imagined restoration of the approach to the Temple of Luxor, which gives some idea of their original position among the flying standards, and of their imposing effect at the end of the long double line of huge

* Moldenke, *op. cit.*, 33.

† Egyptian Queen, Trans. by E. Grove, I. 7.

sphinxes. Those at Luxor were erected by Rameses the Great and his fair queen, Nofre-Tari, about 1360 B.C., and the most perfectly executed of all existing obelisks; so sharply were the hieroglyphics cut, and to such depth (2 inches), that the Arabs managed to mount by inserting their toes. The one on the left, the east, still remains there, but that on the west was taken down by the French, carried to Paris, and there erected in 1836 on the Place de la Concorde, a shaft about 75 feet in height. This western obelisk is shown in the illustration as it stood at Luxor,* upon its original pedestal; this base, however, was left behind by the French, and remains buried.

Forty obelisks of Egypt have survived, down to our day, out of the hundreds which once adorned her temples and palaces. All these are more or less mutilated, only nine now standing in Egypt, ten fallen and broken, and the greater part carried away to foreign lands. In Rome there are nine of Egyptian origin, of which seven probably belonged to the glittering company which once shot up, near the New York Obelisk, in the City of An, viz.:

Campensis Obelisk, on the Monte Citorio, erected by Psametik II. at An, now in five pieces and with most of its hieroglyphs effaced, 71 feet and 5 inches in height.

Flaminian Obelisk, on the Piazza del Popolo, erected by Seti I. at An, now in several pieces, 78½ feet in height.

Mahutean Obelisk, before the Pantheon, erected by

* D'Avennes, *op. cit.*, I., last plate.

Rameses II. at An, with its lower part broken off, and now 20 feet in height.



WESTERN OBELISK, LUXOR.

Vatican Obelisk, on the Piazza di San Pietro, once erected at An, perhaps by Menephthah I., the largest *entire* obelisk out of Egypt, 83 feet and 1½ inches in height.

Sta. Maria Maggiore Obelisk, probably erected originally at An, without inscriptions, 48 feet and 5 inches in height.

Monte Cavallo Obelisk, before the Quirinal, once probably erected at An, without inscriptions, 45 feet in height.

To the above, some authorities also add :

Lateran Obelisk, in front of Church of San Giovanni in Laterano, perhaps erected originally at An, by Thothmes IV., broken in two and re-cemented, the loftiest of all erect obelisks, 105½ feet in height.

Besides these, there are elsewhere, of the same glorious company :

Atmeidan Obelisk, in Constantinople, erected by Thothmes III. at An, the lower part broken off, and now 55 feet and 4 inches in height.

Boboli Gardens Obelisk, in Florence, Italy, erected probably by Rameses II. at An, 16 feet and 1 inch in height.

Alexandrian Obelisk, in London, erected by Thothmeses III. at An, as companion to the New York Obelisk, with hieroglyphs largely obliterated on three sides, 68 feet and 5½ inches in height.

Cleopatra's Needle, in New York, erected by Thothmeses III. at An, with hieroglyphs badly defaced or obliterated around the bottom and up two sides, 69½ feet in height; By its original granite pedestal and limestone base, the height of this monument is increased to nearly 80 feet above the pavement.

A significant fact is found in the fractures, defacement and mutilation shown in nearly all the obelisks which

once stood at An, in comparison with the general preservation or perfection of those at Thebes.

It is but the story of our New York Obelisk that we can now briefly review : as you will see, a record of repeated misfortunes, in the shifting changes of Egyptian—but, we will hope, not of American—politics. Again and again it has been threatened with, and just escaped, the destruction which overwhelmed its companions. But its last, its recent calamity, was the most dangerous of all.

10. *Conveyance of Obelisk from Syené.* With several others (probably three) this monolith was hewn out at Syené in the Eighteenth dynasty, the most glorious period of Egyptian history. Thence the sprightly company of youthful obelisks started on their journey down the Nile valley, for almost 600 miles, to the city of An. As to the mode of conveyance of such huge masses of stone, there is some uncertainty, no picture nor inscription having been found with any direct bearing on this subject. The fitness of the Nile as the medium of transportation is at once suggested ; but of this there is no record. The position of all the great obelisks on the same side of the Nile, the eastern, as that on which the quarries stand, is but a proof, in the opinion of some authors, of the ancient necessity of conveyance of these heavy masses by land, rather than of any choice from a religious point of view.* The only picture extant, having any bearing on the matter, is that from the tomb in El Bersheh, which represents a colossal statue dragged along upon a sledge by main strength, with the labor of several hundred men, while

* Stuart, *Nile Gleanings*, 213.

a few in front pour a liquid over the road-bed, possibly oil, more probably water, to dampen the chafing ropes * or to harden the sand and facilitate the dragging.†

In the approach to the quarries of Syené from the north, Denon states: "In the afternoon I found, in the middle of the desert, the trace of a grand antique road, bordered with large masses of cut stone, which led in a straight line to Syené." ‡

An ancient historian also records§ that, in one case, it required the labor of a couple of thousand men, three years, to transport a huge monolithic chamber to Sais in the Delta. You recall also the tale of Pliny, how an early King, Rhamsesis (probably Rameses II.) brought down an obelisk to the city of *An*, by the exertions of 120,000 men, and then bound his own son to the summit of the shaft, during its erection, so that the officials might not neglect any care. The first instance of the removal of Egyptian obelisks to a foreign land occurred 664 B. C., when Assurbanipal, with his Assyrian hosts, ravaged Thebes and carried two obelisks to his palace at Nineveh, evidently as far as the Red Sea overland; these were ultimately destroyed, with Nineveh itself, by the Medes, 606 B.C. ||

But, in addition to this method, it is highly probable that the Egyptians were accustomed to float obelisks, colossi and huge blocks down the Nile in barges or rafts, during its inundations. It is recorded that they had vessels sometimes 120 feet in length, and others are re-

* Parker, *op. cit.*, Thos. L. Donaldson, 35.

† Compare Champollion-le-Jeune, *op. cit.*, IV., Plate ccclxxxix.

‡ Travels, II., 68.

§ Herodotus, II., 175.

|| Records of the Past, VI. Cooper, *op. cit.*, 18.

ported of 420 feet. Under the Sixth dynasty, Una, a governor, thus describes his conveyance of stones for a pyramid: "I made first a boat of burthen, 60 cubits long and 30 cubits broad," 110 by 55 feet; "as soon as the water rose, I loaded the rafts with immense pieces of granite for the pyramid." *

The Chief Architect under Amenhotep VI. states concerning the transport of colossal statues of that King: "I caused eight rafts to be built; the statues were carried on the river."

Much later, 380 B.C., according to Pliny,† Nectanebo, of the Thirtieth dynasty, cut out an obelisk from the quarry, 80 cubits long (140 feet), which Ptolemy Philadelphus afterward floated on a raft down the Nile and through a canal, and erected in the Arsinoite Nome, near Alexandria.‡

But I think that I have found other circumstantial evidence to the same effect, in the records of the Eighteenth dynasty. The inscription § (quoted in full beyond) on one of the obelisks of Queen Hatasu at Karnak states:

"Her Majesty began the work in the fifteenth year of her reign, the first day of the month Mechir, of the sixteenth year, and finished it on the last day of the month Mesore, making seven months from its commencement in the quarry." On this Cooper remarks, "the month Mechir began about 17th December, and Mesore about the 15th of June," and there he stops. But it happens that on the 17th of June falls the "night of the

* Brugsch, *op. cit.*, I., 425.

† Nat. Hist., bk. xxxvi, ch. 14.

‡ Kenrick, *op. cit.*, II., 503. Parker, *op. cit.*, 21.

§ Cooper, *op. cit.*, 32.

drop," Leila-en-mekta, as the Arabs still call it at Cairo, the momentous night when, according to a dainty conceit of the ancient Egyptians, the mother goddess, Isis, ever lamenting for her slain husband (Osiris), let fall "the divine tear," somewhere upon the upper Nile—and the Nile began to rise! Certain it is that the rise of the eagerly watched sacred river, hardly perceptible at the beginning of June, suddenly every year becomes strongly marked between June 15th and June 20th. So the rush of the work upon the Queen's obelisks to their completion upon exactly that date hardly looks as a mere coincidence, but rather as a sign of carefully planned dispatch, that the obelisks might be ready for the rise of the river, and therefore that their transport was to be effected by floating down the stream. As Queen Hatasu was the sister, the predecessor on the throne, and, for a time, the co-regent of Thothmeses III., an equally energetic monarch, it is probable that his obelisks also—*i. e.*, at least, the New York, London and Constantinople obelisks—were both fashioned and conveyed to the Delta in a very short time, probably therefore on the bosom of the Nile.

We have next to consider certain rulers of Egypt, whose history, with long intervening intervals, is more or less blended with that of our Obelisk, and, in part, inscribed upon its faces. Of these there are five, so that our monolith might well be styled the *Obelisk of the Five Kings*.

II. *The Kingly Builder, Thothmeses III.* Our Obelisk was brought down to An at the command of the Pharaoh Dehuti-mes III. (in Greek, Thothmes, or Thothmeses), and in the early part of his reign, about

the year 1585 B.C. This great and warlike monarch has been styled the Alexander the Great of Egyptian history, the empire, during his reign, having been extended over the whole known world. At the same time, he was one of the great scholars of his kingdom. His very name, Thothmeses, signified "offspring of Thoth," the god of learning and sciences; in the library of the palace at Amada, he is pictured, standing before Sefekh, the goddess of writings and history. During his active life, he erected many temples and palaces, adorned with obelisks, at An and Memphis and Thebes. The portrait of the Royal Builder of our Obelisk was therefore of as much interest to his subjects as to us, constantly represented by brush of painter and tool of sculptor. He received the epithet, Mai-Re, Beloved of the Sun. His name was held in such high veneration that it is found inscribed on large numbers of scarabs and amulets, and on one he is represented worshipping the Sun-Ray, the Obelisk.*

Any object bearing his name, it was positively known, would bring great good luck to the possessor. So mote it be to our fair city of New York! For down the centre of each face of our Obelisk, nearly 3,500 years ago, the King had written, with the usual modesty of kings, his title and his great name, and there they are to this day! During fifty-four years, this mighty monarch, Thothmeses III., ruled over Egypt, and, at his death, was entombed with royal honors, in the Valley of the Kings, near Thebes, for his long sleep, to wait for the call of Osiris. But neither for the body of the King, nor for the obelisks he planted in An, was there to be

* Parker, *op. cit.*

rest. As the obelisks, at a later period, were carried away to another site, at Alexandria, so there came rude disturbance to the sleeping King. In some time of invasion or danger, the faithful Theban priests came to the valley by night, lifted all the coffins of kings and princes out of their stone sarcophagi, bore them over the hills to a wild gorge, Deir-El-Bahari, and there, in the darkness, piled them up hastily in a cavern they had secretly excavated, and covered up its stone portal under a vast heap of sand. The position of this mass of sand, lying so far up on the hillside, excited the suspicion of a wandering Arab in 1879. It is a strange coincidence that, just at the time, in 1880 and 1881, when the Obelisk of Thothmeses was again overturned, to be carried from Egypt over the ocean to New York, the King's resting place was rediscovered and again violated, and the mummy of the Kingly Builder of our Obelisk was for the third time borne away and deposited in the Museum at Cairo. By its side, wrapped tightly in swaddling bands, the paddle was seen, wherewith, in Paradise, the risen Thothmeses might guide his boat over the Sea of Joy. And the mummy was unrolled, and the King's face uncovered, and his right hand, clasping, over the hollow where his heart had been, the King's greatest treasure, not a crown-jewel but a stone scarab, emblem of his hope of resurrection and immortality. Even of that emblem, it was found, he had been already robbed by some Arab, through an opening cleft through the mummy. There was but just time to take a hasty and imperfect photograph, and then, before the bystanders and to the dismay and despair of the Director of the Museum, "the features

crumbled to pieces and vanished like an apparition, and so passed away from human view forever." Yet a wreath of flowers which had been wound around the body by loving hands, before the burial, was found so wonderfully preserved, that even their colors could be distinguished, and they looked as if only recently dried; while a wasp, which, tempted by the flowers, had flown into the coffin before it was closed, thirty-five centuries ago, was found dried up but still perfect, having lasted better than the King.* And this was the last of Earth to Thothmeses.

12. *The Architect of our Obelisk.* Another question of interest is, who was the architect that planned and supervised the erection of our Obelisk? The names are on record of a large number, at least forty, of the great architects of that wonderful land. The glory of Egypt was her architecture, and, as historians recount her architects were held in royal honor. Nearly all were married to daughters or granddaughters of the reigning Pharaoh. One family of successive architects has been studied, reaching from the reign of Seti I. to that of Darius, from father to son for twenty-two generations.† Statues were often erected in their honor, such as that of the great architect of Memphis, Ra-Nef-fer, which was dug up near Cairo.

We fortunately know at least the name of the illustrious architect who erected, at the city of An, the temples and palaces of Thothmeses III., with their decorations, doubtless including our own New York Obelisk.

* Stuart, *Fun. Tent*, 4 and 135.

† Brugsch, *op. cit.*, I.

His offices and titles are thus styled, in an inscription of that day :

“The hereditary Lord and First Governor in Memphis, the true author of the arranging of the temple-feast, the Architect in the town of the Sun, the Chief Superintendent of all the offices in Upper and Lower Egypt, the Head Architect of the King, the Chief Field-officer of the Lord of the Land, the Steward of the King's palace of Thothmeses III.—Amen-men-ant.”

To the names then of Upjohn, Renwick, Hunt, Smith, Bartholdi and others most worthy of honor for the best architecture and decoration of New York, let us add the name of Amen-men-ant, the Architect of our Obelisk.

13. *The City of the Sun.* In Lower Egypt, at the upper end of the Delta, rose the little city of An, or Heliopolis as the Greeks called it, the City of the Sun, bristling with obelisks. “It stood upon a lofty plateau of rocks and sand, surrounded by deep canals and broad lakes, bordered by papyrus meadows and sycamore groves.” The outer line of the present mounds has been traced out by the traveller, Pococke.

In approaching the front of the Temple of the Sun from the northwest, the pilgrim first passed between the most ancient pair of obelisks, erected by Osertasen I. of the Twelfth dynasty, about 2300 B.C. One of these was overturned by the Arabs, 1160 A.D., in search of hidden treasure, and the other still stands erect, the famed Obelisk of An, the oldest erect obelisk in Egypt. Then passing through the huge Pylon, the way lay through a long avenue of marble sphinxes

(some of which still remained at the visit of Pococke in 1743). Beyond rose four obelisks, immediately before the face of the temple. In the first pair, the one on the left, the north-eastern, was the one now in New York; the other, on the right, was the one now in London. In the second pair, was the one now standing in Constantinople, and the fate of the other is unknown.

To the Temple within, as the pilgrim was informed, the wonderful Bird of the Sun, with plumage of red and gold, the Ben-nu or Phoenix, came flying from Arabia, once in five hundred years; according to one tradition,* it bore a great ball of myrrh, with the body of its father enclosed, for burial; according to another, it flung itself into the altar-flame, was consumed, and rose again from its ashes—a consolatory type of the imperishability of all force and life and bloom. Around and about rose obelisks in wonderful number, some of them, according to report, a hundred and eighty feet in height, a Temple and City of Obelisks, as they called it, An-nu. So many of these remained even down to the visit of Abd-el-Latif, in 1203 A.D., that he refers to them as “an innumerable multitude.”† With the exception of a temple at Memphis, this was the most ancient of all Egypt—of antiquity so great that no chronicle existed even then of its first erection. The men who set up our Obelisk at An in the days of Thothmeses, nearly 3500 years ago, looked around, with the same reverence as we now gaze upon our own surviving monument, on the hoary walls of the Temple itself, and

* Herodotus, Euterpe, II., 73.

† Pinkerton, *op. cit.*, XV., 807.

on the still more venerable shaft, the great obelisk of An and its fellow, set up on the rebuilding of the Temple, over 700 years before.

The slender, pointed shafts of the countless obelisks, blazing with gold, rose glittering into the bright clear air of the Egyptian Delta, before the thronging multitudes of worshippers, almost blending, before their admiring eyes, with the keen though kindly rays of the all-conquering Ra, the Sun-Force, the symbol of the warming, vivifying, re-creative power of Nature.

If this town was the actual birthplace of Thothmeses III. (as suggested by the statement on the west face of our Obelisk), very naturally he "embellished the house where he was born." So here, in the early part of his reign, probably between 1590 and 1580 B.C., amid the joyful din of the great Thirty Year Festival (as recorded on the south face), our Obelisk and its fellow were upraised before the taller pair, in front of the Temple of the Sun, thirty-five centuries ago.

It found itself surrounded by the far-famed seat and origin of the profound learning of Egypt, the holy fane to which pilgrims thronged from all the world to seek wisdom. The city was small, about three-quarters of a mile square, and every visitor must have passed almost under the shadow of our Obelisk.

Whatever in later days has inspired mankind, through the spirit and influence of a great world-university, such as that at Alexandria, Leyden, Salamanca, Heidelberg, and Oxford, was here concentrated in the Temple of Ra, with its 13,000 priests chanting before the huge mirror of burnished gold, the sacred hawk in the golden cage, the awful death-emblem, the pyramidal *ben-ben*, in its secret

chamber, and the sacred calf, Mnevis, on its purple bed. The anxious care, which this earliest of the nations gave to the education of woman, was shown in the convent school near by for the Ahi-t, young women of families of the priests ; from its doors came the wedding procession of Asenath, the daughter of the High Priest, Poti-pher-Ra, on her way to the house of Joseph, the Hebrew Prime Minister of an early king.

At a later day, among the priests, there was one, afterward the Hebrew law-giver, Moses, who here received his education, and (according to Hecataëus, Strabo and Manetho) finally stood before the Sun-god as a priest. As he went in and out through the great portal of the Temple, he daily passed between a pair of obelisks, his robe probably at times brushing against the base of the eastern one, which now stands in our Park.

This city of An, too, we may venture to say, was one of the few places of early antiquity where at times might be gathered an assemblage of geographers ; for the keen-witted Egyptian, though home-loving, was eager for knowledge concerning the wide world outside of the Land of Chem. Salt water, indeed, was to him an abomination and defilement, since it was the abode of evil spirits. So it was not until the time of the predecessor of Thothmeses III., his sister, the energetic and clever Queen Hatasu, of Amara, that Egypt had a fleet, the conscientious scruples of her warriors having been removed, before they embarked, by manning her vessels with Phœnician sailors. Egypt also continued in constant connection with foreign geography through the overland caravans, as well as through the enterprise of the Phœnician voyagers themselves, who were

glad to bring to her spices from the Land of Pun-t, tin from Cornwall, corundum from the Island of Sapphire, and all other needed commodities from distant shores, at the very lowest market prices.

But the city of An was ever the particular goal of the foreign traveller. Among these students of the olden time, in humble attendance at the schools of the Temple of the Sun, were Pythagoras, Thales, the Grecian law-giver, Solon, the historian of Egypt, Manetho, and that great traveller, whom we call the Father of History, Herodotus. Here, later, came the geographer Strabo, to whom they pointed out the house in which, three centuries and a half before, Plato had spent three years under the instruction of the Egyptian priests, with Eudoxus, the astronomer, as his fellow-student. Memories of war, too, cluster around our monolith during its stay at An. It looked down upon the hosts of Shishak, marching northward past the walls to the destruction of Jerusalem, and three centuries later on the glorious array of Alexander the Great on his conquering march through the Land of Goshen.

We may well congratulate ourselves on the possession of a monument whose history has been so intimately linked, through these precious associations, with the City of the Sun, over which, at the time of his rebuilding of the sanctuary, Amenemha I. breathed the pathetic prayer (now recorded on the ancient leathern roll in the Museum at Berlin):*

May it not perish by the vicissitudes of time.

May that which is made endure.

But through the desolations of war and of treasure-

* Ebers, *op. cit.*, I., 187.

hunting, and the devastations produced by the building of Cairo, five miles to the southwest, there remains now, on the site of the famous city, near the little Arab village of Mataria, the ancient obelisk of An as the only vestige, with a few rude mounds, ruined heaps of mud from the walls of a later Coptic town, the old spring of the Sun, and a venerable tree, the traditional resting-place, at a later time, of two Jewish fugitives and a little Child.

In the ancient time, however, at the period of the greatest glory of An, here stood our Obelisk for about 1055 years—a happy millennium, soon to be followed by disaster after disaster.

14. *The Second King, Rameses II.* In the Nineteenth dynasty, probably 200 years after (about 1385 B.C.), the illustrious Pharaoh, Rameses II., steps out on the field of Egyptian action. This is the second of the monarchs whose names are connected with our Obelisk.

This warrior-king led out his armies in every direction, and struck fierce blows at all the surrounding nations, who successively yielded to his sway. Among these, haughty Persia, overcome and ravaged by the armies of Egypt, trembled, but bided her time. Then Rameses, in the pride of his manhood, inscribed his name and glory, in double columns of hieroglyphs, on every one of the faces of our Obelisk, and reigned in peace. The long wars were ended, and the warriors rested and the priests sang, and the people rejoiced around our Obelisk within An. But from outside its walls came a minor tone, the sad refrain of the black-bearded captives from the land of Canaan in the brick fields. These are pictured at work on the walls of a

tomb of that period; their hard labor is done under the eye of the Egyptian task-master, who squats near by, with an inscription, "the stick is in my hand, be not idle!"

The great king Rameses died, after a long reign of sixty-seven years, and was buried in the Valley of the Kings. On the strange discovery of his coffin also, in 1881, among the others in the wild Libyan gorge, the royal mummy was taken to the museum at Cairo, unrolled, and the face of the monarch revealed, in his old age. Under the next reign, that of Menephthah I., the captives escaped from the brick fields and out of the city of An to Canaan, where they found a protector in Cyrus, the king of long humbled Persia.

15. *The Third King, Osarkon I* Once more there is a record on our Obelisk, in the decline of the Egyptian monarchy, 400 years after Rameses II. Then came Osarkon I., 933 B.C., in the Twenty-second dynasty, a monarch probably of Assyrian origin. Of him it is said,* "There is every reason to believe that he was a peaceful and wholly undistinguished prince, content to add a few sculptures to the Bubastite portico of his father, and to rule Egypt in quietness during such term of life as Heaven might allow him. His portrait is that of a mild prince, not remarkable for energy or determination."

This gentle Pharaoh, greedy too after everlasting fame in Central Park, narrowly inspected our Obelisk and found two little spots vacant near the lower part of each face, and there he too inscribed his modest tale of virtue.

* Rawlinson. Hist. Anc. Eg., I., 425.

16. *The Fourth King, Ra-mesuth.* Four centuries after this, the opportunity presented itself to Persia, ever mindful of her past humiliation at the hands of Rameses, to wreak her long delayed vengeance.

In the sixth century B.C., the white sails of the Phœnician fleet suddenly glistened off the curved coast of Aigab-t, around the mouths of the Nile, as allies of Persia; swept the navy of Egypt from the Mediterranean, and came sailing up the sacred river. From the north a vast Persian host invaded Egypt, and defeated the forces of Psametik III., after a fierce battle near Pelusium, in which 50,000 Egyptians and 20,000 Persians fell. Thus the savage Persian leader, Cambyses (or Kemba-thet) reigned as king of Egypt, assuming the throne-name of Ra-mesuth. Later in his reign, maddened by failure of an expedition and by suspicion of his subjects, he insulted and stabbed the embalmed body of an Egyptian predecessor, Amasis; scoffed at the god Pthah of Memphis, destroyed his images, and stabbed the sacred bull. Then marching his army through the Delta, he desolated the land with fire and sword, taking the city of An by storm, and the flames of the ancient Sun-Temple rose to the sky. The obelisks he hurled down, or mutilated, using fire and violence (as Strabo sorrowfully recounts), above all, we may be sure, on the *first pair* of Obelisks in front of the Temple, on which the hated cartouches of Thothmeses III. and of Rameses II. were incised. There was in the city (it is reported by Pliny), one magnificent obelisk, 11 cubits in breadth and 120 cubits in height (more than thrice that of our own), to whose foot the conflagration had reached, when the anger of the Persian

King gave way to admiration, and he bade his warriors extinguish the fire. So passed away the glory of An, about the year 520 B.C., and Alexandria gradually took her place as the world's centre of learning.

And there among the ruins, burned and blackened—possibly overthrown and prostrate, as some think—remained that first pair of obelisks, our own and its fellow, for over five centuries, with no new inscription but the fire-mark of the last King Ra-mesuth.

17. *The Fifth King, Augustus.* The recorded history of our Obelisk and of its mate now in London, thus traced for nearly sixteen hundred years, now approaches our era, when Egypt became a part of the Roman Empire. In the year 12 B.C., the eighteenth of the reign of Augustus Cæsar at Rome, these obelisks were both carried by the Romans from An to Alexandria on the sea-coast, and raised once more in front of the grand water-entrance of the Cæsareum (or Sebastum), the great temple erected to commemorate the conquests of the Roman armies. For some reason, now unknown, the name "Cleopatra's Needle," even down to a recent day, has been attached to our own Obelisk while at Alexandria. It is certain that she had died eight years before the removal of the obelisks from An, but it is possible that the plan of their removal may have originated with her. It also appears that there were other monuments or public works in Alexandria with which her name was formerly connected. In regard to one of these, called, in 1743, the Calisch or Canal of Cleopatra, Norden remarked: "The name of Cleopatra, which it retains to this day, gives no ground for assumption as to the time of its original construction.

Some work of repair, carried out at command of a queen of such celebrity, some amusement in which she may have taken part in that locality, or some festival which she may have there displayed, could easily have given occasion to this name."* The same explanation is applicable to the long current name of the Needle at Alexandria.

In the re-erection of the two obelisks, on their arrival from An, the Romans found the lower angles of both shafts badly broken away, and inserted four huge bronze crabs, about sixteen inches in diameter, under each shaft for support. This gave opportunity for another series of inscriptions on the crabs themselves. These record, in Greek and in Latin, the names of the emperor, prefect and architect, by whom the re-erection of the obelisks has been effected. Fragments of two of the ancient crabs are preserved in the Metropolitan Museum of Art, in this city, the original four having been replaced under our monolith by new castings of the same form, size and inscriptions.

At Alexandria, the two monuments remained through the exciting scenes of the revolt of the heathen in 366 A.D., in which the Cæsareum and neighboring temples were burned; through the capture by the Persians in 616 A.D.; through the siege and sack of the city by the Saracens in 640 and 646 A.D.; and through later captures in 823, 924 and 928 A.D. In 1203 A.D., both obelisks were seen standing by the Arab physician, Abd-el-Latif. In 1301, and again in 1303 A.D., violent earthquakes occurred, by one of which its companion was probably overthrown, while our own stout monolith

* Norden, *op. cit.*, 19.

firmly held its place. After that date there are occasional records in the hasty visits of foreign travellers, and futile attempts were made to unravel the mysteries of its hieroglyphics.

One old traveller's note in 1610 A.D. reads thus:

"Of Antiquities there are few remainders: onely an Hieroglyphicall Obelisk of *Theban* marble, as hard well-nigh as *Porphyr*, but of a deeper red, and speckled alike, called *Pharos Needle*, standing where once stood the palace of *Alexander*: and another lying by, and like it, halfe buried in rubbidge."*

And another account in 1738:

"To-day there are only two solitary obelisks, of which one still stands in its ancient position, but the other is broken and almost buried in the ruins."†

To recapitulate its history thus far:

Our Obelisk was quarried about 3470 years ago at Syené, and borne to the City of An, and there stood for 1055 years.

About 520 B.C., burned and defaced by Cambyzes, it remained over 500 years longer among the ruins of the city.

In 12 B.C., carried by the Romans to Alexandria, and there set up, it stood for 1890 years, down to 1879.

For at least 165 years previous to that date, the lower portion of the shaft and the entire pedestal and foundation had been buried in the sand up to the height of about twelve feet on the shaft, as reported by the traveller, Paul Lucas, who very likely chanced to tell the truth, when he visited Alexandria in 1714 A.D. It

* Sandys, *op. cit.*

† Norden, *op. cit.*, I., Introduction.

is not generally known that when, on the defeat of Napoleon, in 1801, the Viceroy of Egypt presented



OBELISK AT ALEXANDRIA, IN 1738.

the fallen obelisk at Alexandria to England, he afterwards gave the standing one (now in New York) to France. The French were several times at the point of its removal to Paris, but found fault with its marred

hieroglyphics. Led by their love for artistic perfection, they accepted the advice, in 1829, of Champollion the Younger, and, in 1836, took the beautiful eastern obelisk from Luxor in its place. Fortunately for us, for the loss by the marring of the Alexandrian monolith, however great, at the hand of time and violence, is far more than offset by the historic interest we possess, in the very scars of this veteran shaft of the ancient City of An.

18. *The Rescue by the Republic.* In its latter days at Alexandria, the monolith was fast approaching destruction through the climate, absence of protection from mutilation, and encroachments of the sea in the subsidence of the coast. Its threatening fate impressed a distinguished archæologist, who wrote :

“The venerable monument, in its sordid surroundings, aroused no sentimental feelings; and it was only when it was seen from the sea that it had some picturesque charm or reminded us of the past greatness of the Greek city.” *

Gorringe has reminded us of the neglect with which the Obelisk was treated in the suburb of that city and “the feeling of disgust aroused by some of its surroundings. No one deemed it worthy of protection and care, even to the extent of preventing its defacement and the accumulation of offal around it. Two men made a business of breaking pieces from the angle of the shaft and edges of the intaglios, for sale to relic hunters. The disagreeable odors and clamors for backsheesh hastened the departure of strangers, who rarely devoted more than a few seconds to its examination. The con-

* Ebers, *op. cit.*, I., 23.

stant washings of the surf had begun to affect the foundation, and, for the last fifteen years, the Obelisk had been gradually inclining more and more toward the sea. In a few years it must have fallen, and almost certainly been broken by the fall. But a more ignoble fate threatened it, in the proposition of some of the foreign residents of Alexandria to erect an apartment house on the adjacent ground, around the Obelisk, which was to adorn the courtyard." * This should suffice in reply to the question, sometimes asked, whether our Obelisk should not have been left to stand in its native land. In 1877, the first active effort to acquire the Obelisk for this country was made by Mr. William Henry Hurlbert, at that time editor of the New York *World*. It is fair to add that, ever since, the Obelisk has found, in the Press of New York, its most watchful and efficient defender in time of need. Through a single conversation with Mr. Hurlbert, a generous and public-spirited citizen, the late Mr. Wm. H. Vanderbilt, became interested in the matter, and undertook to defray all the expenses required to transport the Obelisk to New York, and to re-erect it at the chosen site in Central Park. These expenses much exceeded the original estimate, and ultimately amounted to the sum of \$102,576. The transport of the Luxor Obelisk to Paris cost the French Government nearly \$500,000. At the instance of Mr. Henry G. Stebbins, at that time a Park Commissioner, and of Secretary of State William M. Evarts, the assistance of our Consul General at Alexandria, Mr. E. E. Farman, was invoked. In 1879, the Egyptian Government, through the Khédive, Ismail, and

* Gorringer, *op. cit.*, I.

his successor, Tewfik, consented to the presentation of the Obelisk, as a free gift, to the City of New York. In order to carry out the conveyance to New York, the services of the late Lieut. Commander Henry H. Gorringer of the United States Navy were secured. Through his skill as a diplomat, an engineer and a navigator, as well as his courage as a man in face of the opposition of the foreign residents and subordinate officials at Alexandria, the Obelisk was successfully taken down, embarked and conveyed to this city. With reasonable pride, Gorringer reminds us that "the French waited about twenty-five years, and the English nearly seventy-five years before removing the obelisks they had selected. There was a feeling in Egypt that the Americans would certainly require a century to perfect their arrangements." The total period from the acquisition and taking down of our Obelisk to its re-erection in Central Park, inclusive, was less than fourteen months!

The series of steps in this transfer have been described in full detail, in the work of Gorringer. From the bottom of the shaft and pedestal the sand was dug away. A staging was first erected, and the entire shaft and pyramidion sheathed with heavy plank, after the removal of the staging. The column was then supported upon steel towers and enormous trunnions, gradually turned and lowered, finally launched in a caisson, towed to Alexandria, raised in a floating dock, and embarked in the steamer "Dessoug," through a hole in its bow. After a voyage of thirty-seven days with a picked-up crew and rough officers, whom Gorringer describes as well fitted for a pirate, the

pedestal was landed at West 56th Street, New York ; but the shaft was disembarked at Staten Island upon pontoons, towed to the foot of West 96th Street, and there landed. Thence it was slowly dragged around the north end of Central Park, down Fifth Avenue, and on a trestle work at 82d Street, over to the knoll in the Park ; once more raised and turned upon the heavy trunnions ; lowered into its place, and at last successfully re-erected on its present site. It should be added that this alone, of all obelisks removed from Egypt, now stands on its original granite pedestal, and, beneath this, the original base of three tiers of lime stone slabs.

The Obelisk was thus finally raised, as we hope, for all time, on January 22, 1881. It had hardly settled into its place and the grounds around it been re-arranged, when, only five months after, his life-work done, at the age of forty-four, Gorringe died. From photographs kindly made for me by Mr. Harry G. Caffall, of this city, I have already shown a view of the monolith obelisk which has been raised, as a memorial over the grave of Gorringe, in Rockland Cemetery, near Piermont, N. Y.; and I am glad to exhibit, what Commander Gorringe was too modest to include in the illustrations of his fine monograph on Egyptian Obelisks, his portrait, from the bronze medallion on the same monument. Born in Barbadoes, his life offers another example, like that of Alexander Hamilton, of the debt which New York owes to the energy of adopted sons of West India origin. As the inscription on his tomb records :

Brave, tender and true,
He passed away lamented by those who knew his worth,
Whose loving hands have raised this obelisk to his memory.

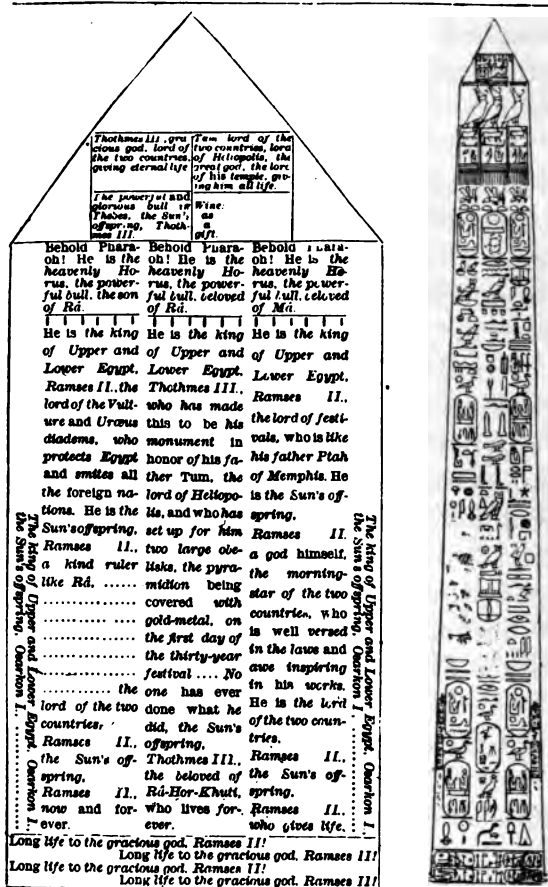
19. *The Hieroglyphic Proclamations.*—It will not be without bearing on our purpose, if we give attention to some of the hieroglyphs which cover the four faces of the Obelisk, and to which we owe our chief knowledge of its history and antiquity. These are well shown, though with some errors and imperfections, in the drawing made by Burton and Bonomi in 1827, while our monolith stood at Alexandria. Down the centre of each face of the shaft runs the self-laudatory inscription of the royal builder, Thothmeses III. In the column on each side you notice the modest remarks of Rameses II., two hundred years after. At the very base, the ascriptions of long life to the King—like the Hoch! the Hurrah! or the Vive l'Empereur! of later days. Near the bottom, on each side, the little bare spots which Osarkon I., four hundred years after, covered with his glory in diminutive characters.

Exception has been sometimes taken to the somewhat magniloquent and self-assertive tone of Thothmeses and his successors in these inscriptions, as well as the absence of greatly desired information from so ancient a record. But it will interest you to glance for a moment at the vignette, from the dedication of Capt. Norden's work on Egypt to King Frederic V. of Denmark, a little over a century ago.* In this the King stands enthroned as a god, with the obelisk bowed down before him, the pyramid withdrawn to the rear, the Sphinx aghast with admiration, the globe at his feet, and the President of the Royal Academy of Sciences of Copenhagen kneeling in humble submission.

20. *The Brilliant Gilded Cap.* We have next to con-

* Norden, *op cit.*, I.

sider the evidence of the former capping of the apex of the pyramidion of our Obelisk with gilded metal



SOUTH FACE OF OBELISK. NEW YORK.

The cut is from Dr. Moldenke's work, by permission of the publishers.

coating, and of the propriety of its restoration, at least, and of regilding the rest of the pyramidion below.

Notwithstanding the defacement of the characters on

the south side of the New York Obelisk, there is good authority * to show that those in the central column inform us :

“ Thothmes III. has made this to be his monument, in honor of his Father Tum [*i. e.*, the Setting Sun], the Lord of An, and . . . has set up for him two large obelisks [note their sign in the middle of the face], the pyramidion being covered with gold metal,” etc.; *i. e.*, on this emblem of the sunbeam, the point or apex of the pyramidion was surmounted by a cap of gold or gilded bronze, which would glitter at the first touch of Ra, the morning light, and at eve send back the last gleam of Tum, the Setting Sun.

The careful archæologist, Ebers, believes that the hieroglyphs on our Obelisk were themselves gilded. He states, “The hieroglyphs engraved in the granite, to perpetuate the glory of his name, were inlaid with silver gilt, and its point was capped with the same metal. It was dedicated to the Sun-God, Ra, and formerly the beams of the day-star were mirrored in the polished surface of the granite and gold.” To this, he adds the footnote : “The expression on the Obelisk itself, *tasm* or *uasm*, appears to mean gilded ; for the word does not appear in any lists of metals, nor does it enter into the computations of metals, or lists recording the weight of different kinds of gold.” † Moldenke translates the same word, *u:em*, as gold metal, with the note : “The gold metal mentioned here may have been only an alloy of copper and gold. Some think that it was the *electrum* of the ancients, which was an alloy of silver and gold.”

* Moldenke, *op. cit.*, 76.

† Ebers, *op. cit.*, I., 23.

Elsewhere he states : " The stone was polished to a high state of perfection, and the inscriptions added in intaglio-relievo by skilled stone-cutters, under the direction of scribes. Whether the figures of these inscriptions were filled out with copper or gold, as some maintain, is extremely doubtful. With the pyramidion, it was different. While its usual dedicatory inscriptions remained undoubtedly as they were chiselled, the point or apex seems to have been surmounted by gold or gilded bronze. . . . It would appear, from extant obelisks, that, in order to have the gold added, the stone apex was not brought out to a fine point, but left rugged and incomplete." *

Exactly the same testimony is borne by the inscriptions on the obelisks at London, Paris, and Rome. The archæologists of London and Paris have repeatedly expressed strong protest † against the omitted replacement of the ancient gilding upon the two monoliths in those cities, which now, gray, dull and forlorn, present but a dismal caricature of their ancient glory.

On this deplorable effect, a French traveller in Egypt remarks :

" The Luxor Obelisk, after so many centuries of antiquity, is now as young, as brilliant as the day when the hand of Sesostris placed it upon its pedestal. Its stone has the same tints of a pale rose color ; and under the floods of light which this fiery sky pours down upon it, one would suppose it to have but yesterday arrived from the bosom of the quarry of Syené. I confess that I could not avoid some comparison, since that time, when

* Moldenke, *op. cit.*, 18 and 59.

† Perrot et Chipiez, *op. cit.*, I., 621, etc.; Cooper, *op. cit.*, 85, etc.

once more I looked upon its twin brother, transferred to the midst of the fogs of the Seine, dyed by the rain to a grayish tint which made it resemble the Fontainebleau sandstone, bleached, discolored and already disintegrating, under the influence of a foggy and inhospitable sky."*

The inscriptions on the pedestal of the Paris Obelisk, in the Place de la Concorde, are gilded, and M. J. J. Hittorf, the designer of the pedestal, offered a strong argument in favor of putting a bronze cap, possibly gilded, upon the pyramidion of that monument.

Other authorities state, of the same obelisk, "the apex is left unfinished, and still seems to demand, in the damp air of Europe, the protection of its former gilded cap,"† and "it appears belittled by its erection as a solitary monolith, in the Place de la Concorde, and without its former gilding."‡

On the London Obelisk, the former companion of our own at An, in the central column, on the first (east) side §, Thothmeses announces :

"He made [this] in his monuments to his father *Hor-em-mak-khou*. He erected two very great obelisks, capped with gold (when he celebrated) the panegyry of his Father, who loves him. He did (it), the son of the Sun, Thothmeses, the best of existences, Beloved of *Hor-em-makh-khou*."||

The sign of the pair of obelisks, above referred to, is distinctly preserved both on the second and fourth faces of this obelisk, and is well shown by Champollion-le-Jeune in Plates ccccxlv. and ccccxlvi. (*op. cit.*). This testimony from the London monument is equally con-

* Poitou, *op. cit.*, 275.

† Cooper *op. cit.*, 85.

‡ Perrot et Chipiez. *op. cit.*, 621.

§ Cooper, *op. cit.*, 134.

|| Parker, *op. cit.*, T. L. Donaldson, 29, and S. Birch, 43.

clusive in regard to its New York consort, particularly in view of the results of Dr. Moldenke's study of the characters on its south face.

For other evidence in the same direction we may return to the very tip of the pyramidion of our own monolith. It is not generally known, and no reference is made to the fact in Gorringer's book, that this apex was imperfect when the Needle stood at Alexandria. This is distinctly shown in all photographs up to 1879, in many of the drawings by travellers for a hundred and fifty years before, and in Plate ccccxliv. of Champollion-le-Jeune. Gorringer had this apparent defect repaired in 1880 by surmounting it with a new piece of granite about six inches in height. This is now the more plainly visible from below, as the cement with which it was attached has been unfortunately in part dissolved out by rains, and has run down and whitened the faces of the pyramidion below. It is, I think, more than a curious coincidence, that the pyramidion of the London obelisk is also truncated in the same way, as shown in the two plates of Champollion-le-Jeune, already mentioned. In regard to this it is stated: "The apex is roughly cut and damaged, it having been covered, like most of the obelisks of Thothmeses III., with a bronze cap." *

The same truncation and imperfection have been already noted by Champollion-le-Jeune on obelisks in the second court of the Palace at Karnak (Plate scccxii., cccxiii., and cccxiv.), and by all observers, in regard to the ancient obelisk at An, the Luxor obelisk and its fellow at Paris. In the case of these last two, a

* Cooper, *op. cit.*, 125.

shoulder around the base of the pyramidion renders certain, what may be equally true of the New York obelisk and the rest, that the shaft was originally left imperfect at the top, with the expectation that it would be perpetually covered by a metal cap. But it is also possible, in our own monolith and that of London, that, during its mutilation by the Persians at An, the glittering gilded tip may have been struck off, both metal and the stone beneath, as a piece of plunder.

Again, before the new tip was put on the pyramidion of our monolith, Goringe found traces of ancient cement adhering to the faces below. He gathered a gram of this, to be chemically examined for traces of gold or copper, as he states,* "to determine whether or not the pyramidion had been gilded or covered with bronze." As only a mere trace of copper (0.04 per cent.) was found in these few particles of cement, he came to the conclusion that "there was no evidence of either gold or copper having been attached to it at a previous period." However, the very presence of that cement would seem to testify to the former attachment of some object to the pyramidion—plainly the gilded cap referred to in the inscription below.

There is another fact, observed in the figures carved upon the pyramidion, which may have similar bearing on our present subject. In the squares on two of the four faces, the Sun-god *Ra* is represented, and on the other two, the Sun-god *Tum*. It is strange that the head of *Ra* in both cases is now nearly effaced, while that of *Atum* is well preserved. Goringe states: "It is barely possible that the head of *Ra* may have been

* Goringe, *op. cit.*, Appendix, 159.

gilded, while that of *Atum* was only polished like the rest of the surfaces, and that this gilding may have been the cause of the obliteration." * However, if either was to be distinguished by gilding it would certainly have been *Atum*, to whom the Temple of the Sun was dedicated, at least during the XVIIIth dynasty; the effect of gilding could only have been toward protection against the sun and weather; and the effacement of the head of *Ra* may have been due to the hand of violence of some zealot of *Atum*, or of some marauder in the service of Cambyses.

Again, the exquisite and wonderful sharpness and perfection of a large part of the hieroglyphs on the four faces of the pyramidion, surfaces peculiarly exposed to weather erosion, may indicate former protection by direct gilding upon that part of the stone.

Another reason for the replacement of the gilded cap upon our Obelisk is the fact of the general, if not universal, Egyptian custom of decoration of their obelisks in their original condition, both by high polish of the stone, and by attachment of gold in the form of gilding to the entire surface of the pyramidion, or of a gilded cap of copper or bronze, or by filling the incised hieroglyphs over the entire monument with pure gold or gilded bronze, or by gilding the whole shaft (except the intaglios) from top to bottom. In the Hay Collection of Antiquities at Boston, Mass., there is now "a large fragment of well polished, red syenitic granite, having upon its surface the remains of gilding." † Some of the evidence on this point will be here presented.

* Gorringe *op. cit.*, 62 and 63, note.

† Cooper, *op. cit.*, 23, footnote.

As to the oldest erect obelisk, that of Osirtasen I. of the XIIth dynasty, now standing on the site of An, and its long buried companion, the Arab writer Kodhai refers to them both as "being extremely wonderful. On their summit are two pointed caps in copper," probably gilded bronze.* This obelisk is square, formed of a single block, pointed at the top, which is a covering of copper as yellow as gold, above which is the figure of a man sitting in his chair, looking at the rising sun. The companion was overturned by the Arabs in 1160 A.D., in search of treasure supposed to be buried beneath, of which exploit Mohammed, the son of Abdarrahim, discreetly remarks, "that one of the obelisks of Pharaoh, which were at Mataria, near Cairo, fell down, and a great quantity of copper was taken from the top."† The copper cap on the erect obelisk at An was still seen, in 1203 A.D., by the Arabic physician Abd-el-Latif, and by various other observers since.‡

The two obelisks of the temple of Luxor, in Thebes, were erected by Rameses II., and excel all others in artistic execution; one still remains at Luxor, and the other was removed in 1836 to Paris. Mariette maintains that the summit of each was covered with a cap of gilded bronze,§ and this is confirmed by the rough execution of the pyramidion, and by a bevel below, intended to receive the edge of the cap. He also believes that the rough faces of the entire shaft were completely gilded, with the exception of the highly polished bot-

* Moldenke, *op. cit.*, 123.

† Parker, *op. cit.*, 29.

‡ Pinkerton, *op. cit.*, xv., 802 and 827.

§ Also Wilkinson, *Gen. View of Egypt*, 316.

toms of the hieroglyphs, which remained uncovered, retaining the natural color of the granite.

At Karnak are two obelisks of Queen Hatasu of the XVIIIth dynasty, the sister of Thothmeses III.; one is fallen and the other erect, the latter 97½ feet in height, the loftiest now standing in Egypt. Around the base runs an inscription :

" The Queen, the pure gold of Monarchs,
Had dedicated to her father, Amen of Thebes,
Two obelisks of mahet stone (red granite),
Taken from the quarries of the south.
Their upper parts were ornamented with pure gold,
Taken from the chiefs of all nations.
Her Majesty gave two gilded obelisks to her father Amen,
That her name should remain permanent,
Always and forever in this Temple.
Each was made of a single stone of red mahet stone,
Without joint or rivet.
Her Majesty began the work
In the fifteenth year of her reign,
The first day of the month Mechir, of the sixteenth year,
And finished it on the last day of the month Mesore,
Making seven months from its commencement in the quarry." *

In reference to this inscription, Mariette-Bey states :

" 1. The summit of the obelisk was covered over with 'pure gold taken from the chiefs of the nation.' Unless this simply implies an apex overlaid with a casing of gilded copper, as the apex of the obelisk at Heliopolis must have been, this inscription possibly refers to the sphere (of gold?) which is represented on certain bas-reliefs at Sakkarah.

" 2. The obelisk itself was no doubt gilded from top to bottom ; in examining closely, one may notice that the hieroglyphs were carefully polished, and moreover that the plain surface of this monument was left compara-

* Cooper, *op. cit.*, 32.

tively rugged ; from which it may be inferred that the plain surface, having a coating of white stucco, the like of which may be seen on so many Egyptian monuments, alone received this costly embellishment of gilding, the hieroglyphs themselves retaining the original color and actual surface of the granite." *

There are also at Karnak two obelisks of Thothmeses I., one fallen and broken, the other erect, 71 feet and 7 inches in height. Concerning the pyramidion of the latter, Cooper states : "The pyramidion at the apex, which is rather more acute than in the later examples, is also adorned with a votive vignette, and is the oldest illustration of that practice. Evidently, therefore, this obelisk was never designed for a metal covering, but it may have had its summit gilded for the better preservation of the sculpture upon it . . . for its highly polished surface would not prevent such an application of the precious metal."

On the walls of the Temple at Karnak, according to Wilkinson,† there is a representation of the dedication of an obelisk (probably the Lateran obelisk), in which this is described as "resplendent with gold." On this obelisk of St. John Lateran, now at Rome, by some authorities‡ considered one of the former companions of the New York obelisk at An, the hieroglyphs of the right column, on the south side, inform us :

"The son of the Sun, Thothmes (IV.),
Diadem of diadems, set it up in Thebes;
Capping it with gold,
Illuminating Uas with its beauty." §

* Mariette Bey, *op. cit.*, 171.

† Manners and Customs, III., 237.

‡ Parker *op. cit.*, 2.

§ Birch, in Parker, *op. cit.*, 45; Cooper, *op. cit.*, 40.

"In a fragment from the Temple of El Assasif, amidst a list of offerings which this monarch presented to the Temple of the god . . . are described

'two obelisks (of granite) rising to a height of 108 cubits, inlaid with gold throughout their length, made in their rays.' *

These obelisks have long disappeared."

Dr. Birch also mentions that the tombs in the Libyan range, behind Gournah and El Assasif, "are full of the scenes of the reign of Thothmeses (III.). Two great obelisks of 188 cubits high, with gilded tops, are recorded in these sepulchres."

Two obelisks were also given by Thothmeses III. to the Temple of Amen. "On each is one vertical line, containing the names and title of the King, and that

'he has set up two great obelisks capped (ben ben am nub) with gold.' "†

At Tanis, Petrie observed a sunk surface all over the pyramidion of one obelisk: "This was doubtless to fit on a cap of metal, flush with the general surface. It is singular that this evidence of a cap should remain, while the fellow obelisk is quite smooth to much nearer the apex." ‡

A singular application of another metal to the same purpose, only possible in so arid a climate, is recorded on the last of the Pharaonic obelisks, two small ones of Nectanebes, from the vicinity of Memphis, and now preserved in the British Museum. On one side, the King states, "he has set up an obelisk in his house of basalt; it is capped with black metal (iron); they have given him all perfect life, like the sun." §

* Lepsius, *Abth.* III., tab. 27, 11.

† Dr. Birch, Parker, *op. cit.*, 42.

‡ Petrie, Tanis, 26.

§ Parker, *op. cit.*, 55.

Again, it should be remembered that the very object and idea of the obelisk, as an emblem of the dazzling Sun-beam, required, for the desired impression, both lustrous polish and brilliant gilding. The imposing and inspiring effect originally produced by this decoration may be understood from the following quotations :

In an inscription on a wall in the Temple of Amen at Ape, there is a description of the obelisks raised by Thothmeses III., in the construction of which silver, gold, iron and copper were not spared, and "which now shine in their splendor on the surface of the water, and fill the land with their light like the stars on the body of the heavenly goddess Nut."

In a similar way the impression produced by the obelisks of Queen Hatasu (or Hashepes) is described :

"The woman-King Makara, the gold among Kings, she has executed (these obelisks) as her memorial for her father, Amen of Thebes, since she had erected to him two large obelisks of hard granite of the South ; their tops are covered with copper of the best war-tributes of all countries ; they are seen a great many miles off ; it is a flood of shining splendor when the sun rises between the two."*

Their effect at a distance must have been (as suggested to me by Prof. G. W. Plympton) like that of our modern heliographs.

In the Flaminian obelisk, formerly erected at An by Seti I., and now on the Piazza del Popolo, at Rome, Seti is mentioned in the inscriptions of the central column on the west side, as

"The King, Pharaoh, establisher of justice,
(Who) fills An-nu with obelisks,
To illustrate with (their) rays †
(Or, "in the light of the beams of") ‡
The Temple of the Sun ;"

* Brugsch, *op. cit.*, I., 378.

† Parker, *op. cit.*, 16.

‡ Birch, Parker, *op. cit.*, 47.

here also we find a plain allusion to these monoliths as emblems of the Sun-beam.

In view, therefore, of these four points, viz.,

(1) the testimony of the hieroglyphs on the south face of our obelisk, and of those on its fellow, now at London ;

(2) the indications of cement still adhering to the pyramidion and its broken off apex ;

(3) the predominant custom of gilding their obelisks by the ancient Egyptians and by the sovereigns of this dynasty, particularly at An ; and

(4) the appropriate effect of brilliance, intended to be produced by an emblem of light,

I would submit to the judgment of this Society, the educated citizens of New York, and the intelligent Park Commissioners who have this monolith in their care, that good taste and consistency require the following restorations :

(1) the addition of a well gilded pyramidal cap of some durable metal, for a short distance down over the apex of the pyramidion, perhaps nearly down to the picture squares. For the protection of the monolith from lightning, this cap might be connected with the ground by a stout copper lightning-rod, running down the N. W. (the least conspicuous) corner; it should be, at least in the upper part, gilded, to prevent staining the stone.

(2) the gilding of the surface of the stone, over the rest of the pyramidion-surface.

(3) the gilding of the hieroglyphs below, perhaps only those of the original central column of Thothmeses III., down to the bottom of the shaft. This

would chiefly apply to the N. and E. sides, as the hieroglyphs are largely obliterated on the S. and W. sides.

Such a replacement of the ancient decoration need not be expensive, and would prove a very efficient additional protection of the monolith from weather attack and entrance of moisture at its summit, the most vulnerable point, as well as within the hollows of the intaglios.

21. *The Attack of the Last Enemy.* It need hardly be added, how irreparable would be the loss to the value and interest of the obelisk in our eyes, if there should be any further injury to these hieroglyphics. Through them we trace almost its whole story of adventure. Yet this is the very danger which still threatens many of them, but a danger which can be prevented. For we have now to consider the decay of its surface until eight or nine years ago. As to the causes of that decay many views have been advanced, whose discussion is deferred to another occasion. When warned, it is said, even before the erection of the monolith, in regard to its need of protection against our climate, Commander Gorringe seemed to find it as difficult to believe that the imperishable "heart-stone" of Syené could be in danger, as to anticipate that, in a few months more, his own stout heart would give way forever on earth; and he replied: "The Obelisk has lasted nearly 4000 years, and will probably last 4000 more."* This seemed to be confirmed by the examination of a geologist from Philadelphia, who reported that the stone was sound. But, in defiance of the Quaker, within a couple of years, little pieces of the granite began to

* Trans. N. Y. Acad. Sci., V. (1886).

drop all around the base. Almost an ounce of these was then swept up by another expert and carefully



FRESH GRANITE. QUARRY AT SYENE.

weighed, who reported that, at that rate, it would take 6000 years to do any appreciable harm.*

But now great flakes began to fall. For there was a deep and insidious internal decay going on, of which

* Evening Post, N. Y., Oct. 30, 1883. Building, VI. (1887), No. 24, 1.

he had no suspicion. This I can now illustrate to you by two views ; first, by a photograph, under the microscope, of a thin slice of the original granite fresh from the quarry of Syené. This shows the feldspars and



WEATHERED GRANITE, FLAKE FROM NEW YORK OBELISK.

other minerals in a comparatively solid and transparent condition, tightly hugging that bright little crystal of oligoclase—the most perishable of all—in the middle.

But now look on this picture—a similar slice from a decayed flake on the surface of the Obelisk, after near-

ly five years' weathering—as it must be confessed, full of the crow's feet and wrinkles and lines of age. Such are the results of life in New York!

In the fall of 1884, the danger was brought to the notice of the Park Commissioners, who decided, but not until the fall of 1885, to resort to a water-proofing process, founded on the application of melted paraffin to the artificially warmed surface of the stone. As I was not then consulted on the matter, I feel the more free to express the opinion that the selection of this process was most fortunate, in regard to its own fitness for the purpose in view; while, of course, if it had not been under patent, its application to a public monument would have been preferable and less open to objection. Meanwhile the poor Obelisk had stood here, entirely unprotected from the elements, for four years and eight months.

In the preliminary cleaning of its surface, many spots were found deeply decayed, especially on the south and west sides of both shaft and pedestal—some large pieces so loose that they would scarcely bear the hand upon them without falling. A Park Commissioner directed the manager "not to remove any flakes from the surface unless he was obliged to do so." A large number of those flakes hanging most loosely and crumbling were so removed, to the extent of two and one-half barrels full. This whole procedure, which, of course, had no necessary connection with the subsequent process of treatment, was due to a most deplorable error of judgment. All the loose fragments should have been hardened and re-cemented in place, whatever the time and cost required. The sculptured surface of the Obelisk,

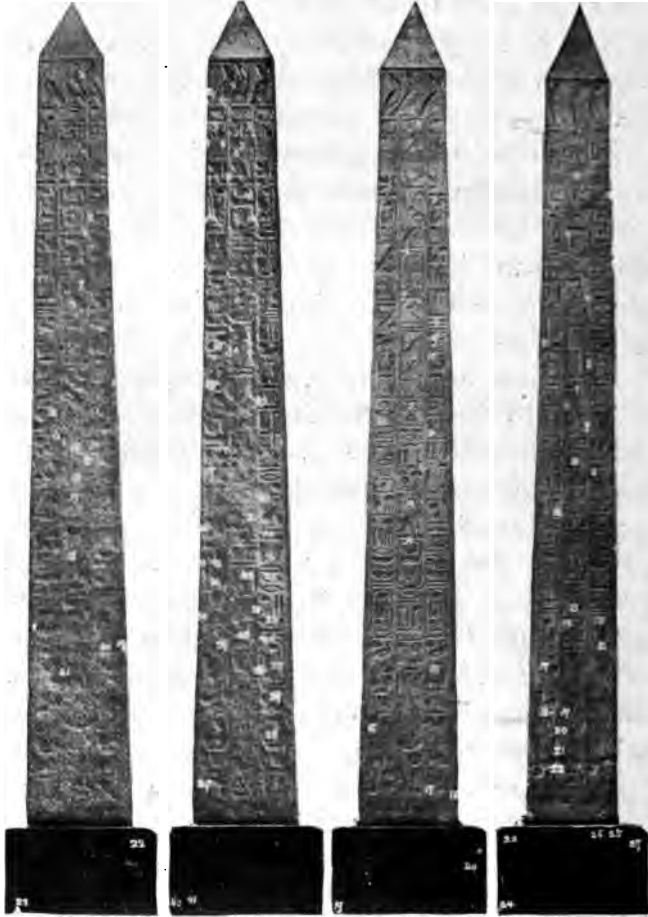
in its misfortune, should have been skilfully treated for preservation, as a jeweller would treat the crumbling surface of an ancient intaglio.

On Nov. 6, 1885, the water-proofing was begun and completed in a week. Flat surfaces of the stone were warmed for a couple of minutes by a charcoal stove, held an inch or two away, and projecting parts by a benzine blast-lamp. Then the melted paraffin was applied with a brush, and, the surface being re-warmed, the paraffin sank into the stone, probably a little over half an inch. Since that date, during the last seven years, there has been no sign of further change in the stone, no visible decay, not a single fragment fallen.

In regard to the preservation of similar obelisks in Europe, it may be added that the Paris obelisk, formerly at Luxor, was varnished with a solution of caoutchouc; the London obelisk, soon after its arrival, by the engineer, John Dixon, with a solution of water-glass, and again, later, by Mr. John Browning, with a solution of gum dammar, containing also wax and corrosive sublimate. There is some uncertainty whether, on either monolith, the surface has been satisfactorily protected from crumbling.

In the winter of 1889, a committee of six persons, appointed by the Park Board, as experts, re-examined the Obelisk, made various experiments, and unani-
mously reported, in the following May, 1890, that they had found the general surface satisfactory, and the water-proofing process so well adapted to the purpose that it was desirable to introduce more paraffin to a greater depth into certain of the old badly decayed spots. A chart of these was prepared, numbered down-

ward on each face. When lightly tapped, such a spot gave forth a dull, hollow sound, indicating that a fine



DECAYED SPOTS, FACE OF NEW YORK OBELISK.

crack ran underneath, which, on account of its depth, may not have been filled with paraffin during the waterproofing. If ever such a crevice should allow the entrance of rain-water, there will enter, too, the spear of

the Ice King, the tiny sheet of water will expand with irresistible force, and a hieroglyph will fall.

In the early part of July, 1890, a second committee devised certain changes in the apparatus and process, to promote the utmost safety in its application. Experiments were carried on upon a huge boulder of granite of similar nature, discovered near Bronxville, in Westchester County, fully three times the bulk of the obelisk. But let no one trust the apparent evidence of his own eyes and hereafter charge that this huge boulder was roasted until it split in two! Nature cleaved that rock long ago. The low degree of warmth really used can be judged from the fact that a child might plunge his hand, like a martyr of old, into the caldron of melted paraffin, but without discomfort; it is a temperature of 146° F., that in which the surfaces of this and other happy obelisks have basked in the sun of Egypt for thirty or forty centuries.

It was recommended by the Committee, to use only the charcoal stove, and to apply that at a distance of two feet from the decayed surface, for a period of at least two hours on each spot; then immediately to adjust closely to the spot a three-sided tank, kept filled with melted paraffin, as long as this would soak into the warmed stone—to a depth of about 2 inches. The process would require over four hours' careful work on each of the decayed spots, of which there are about III.

As to cost, you may remember the statement by the Director of the Metropolitan Museum of Art, that the care of a single collection in that building now costs \$4000 per year. The expenditure of about half that

sum, once for all, is likely to complete the protection of these spots. So far too, remember, the Obelisk has itself cost New York City nothing; with the help of its good friend, it came to us a free gift. The only expense, less than a thousand dollars, resulted from our own neglect of it, up to the year 1885.

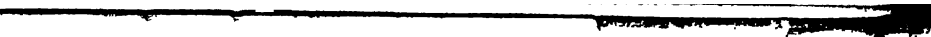
In response to these recommendations of the committees, nothing was done in the summer of 1890. But a perusal of the attractive columns of the City Record, December 30, 1890, exhilarated our hearts over an official notice, to the effect that, at last, on application of the Park Board, the expenditure of \$2800 on the re-treatment of the decayed spots, had been authorized by unanimous vote of the Mayor and Board of Aldermen.

Since then the two Committee reports have reposed, perfectly safe and innocuous, in the archives of the Park Board.

Last June, 1892, however, an application was made by the President of the Park Board, for an appropriation of \$2000 for the purpose, to the Board of Estimate and Apportionment, and, I am informed, this appropriation for the repair of the Obelisk has since been made. Under the supervision of the President of the Board and his able associates, we may now confidently look forward to speedy preparations for this important work, since they have now entire authority for the expenditure, and also—most lucky of Boards—the means! But beyond the coming summer, there is peril. Where an Obelisk is concerned, it is as dangerous to play with frost as with fire. We know the fancied security and its disastrous results from the years 1881 to 1885.

Meanwhile, there stands the monolith, in this last misfortune, to face the bitter winter, its decayed spots still giving to the touch that ominous hollow sound. If we have reason to prize it as a unique relic of antiquity, the oldest on our continent ; or for its testimony to the workingman of New York of the patient and thorough work of his brother at Syené ; or for its precious historical and religious associations ; or, above all, as it seems to me, for its cheery message from the wisest and most patient of ancient nations to the most active, restless and discontented nation of to-day, a message of light and hope—the good time coming—then let us guard and care for our trust.

All Central Park in its beauty might be blotted out and be revived again ; but all the wealth of New York could not replace one fallen hieroglyph.



IV.—*A Study of the New York Obelisk as a Decayed Boulder.*

BY ALEXIS A. JULIEN.

Read April 24, 1893.

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To the geologist, musing over a rusty coated, ice-scratched pebble—picked up, perhaps, the other day in Central Park, not far from the base of the Obelisk, or over some huge boulder, which, on tap

of hammer or thrust of cane, tumbles at once into fragments, a fascinating but most perplexing problem is offered in trying to unravel the vicissitudes of its past history. Through the work of Dolomieu, T. Sterry Hunt, and others, we have caught some glimpses of its quiet youth, when, locked up within the original rock-stratum, its rounded form was first slowly etched out by the underground gnomes—the forces of subterranean disintegration and chemical decay.

Then followed the stirring experiences of its middle age, when, in our latitude, torn out by torrent or by the continental glacier from its softened bed, it was rasped by partly decayed and angular gravel, hurled down deep fissures, crushed under the enormous weight of thousands of feet of ice, jammed against other boulders, ground down over the rocky glacier-bottom, and at times rolled over and over in the rush of a glacier-river.

At last came old age, when, stranded upon the surface of the land, it was drenched by rains or melting snow, repeatedly surfaced-dried by intense heat of summer's sun, even roasted at times by passing forest-fires, frozen and thawed again and again, and soaked in organic acids from soil or swamp, until completely changed in molecular arrangement, and partly in material, through and through.

Within, by absorption of oxygen and water, and consequent production of new salts and combinations of increased molecular volume, the entire aggregate of mineral crystals remained locked in intense strain, the relief attained by partial closing of old joint-planes having been offset by development, through such minerals as the feldspars, of innumerable fine clefts and spongy vacuoles.

Without, by the insinuation of water and thrusting force of frost-crystals, the co-adherence of the grains was loosened, the inner strain largely relieved, and the outer part of the boulder expanded in a series of coats, successively softer, more porous and swollen toward the exterior.

So at last the successive crusts have tended to exfoliate and fall away, until many an aged boulder has crumbled to fragments and dust, with its story forever untold.

In the case of some particular boulder, the student may often make out part of this history, its original site and source, its glacial experience, the distance of its transport, etc.; but as to the exact agents of decay, their relative efficiency, and, especially, the duration of the trial, he possesses no measure and can make no estimate.

If only some boulder could be found whose whole story was known, whose hieroglyphic striæ could be entirely interpreted!

It has occurred to me that on many of these points we may be able to gain some facts of value through a special study of at least one huge block of hewn granite, whose known but vast antiquity renders it, to some degree, comparable with a natural boulder, while its record of varying experiences of natural and artificial agencies of destruction is quite definitely known. A recent re-awakening of public interest in the Egyptian Obelisk, now in Central Park, New York, and of anxiety as to its permanent preservation, led to the appointment, in 1890, by the Board of Commissioners of the Public Parks, of two successive Committees of Experts to consider these subjects. Service on these committees gave me the opportunity of commencing a series of experiments, whose continuance, at intervals, during the last three years, has yielded the results presented in this paper.

Moreover, the Nile valley, as well as the streets and squares of European capitals, is strewn with similar Egyptian boulders, of huge size and of the same homogeneous granite, which have long lain in definite positions, exposed to known agencies of geological change, during periods coeval with the establishment of ancient dynasties, often yet plainly recorded upon their faces. For at least the partial elucidation of our problem, we are fortunate to possess, in this peculiar class of historical monuments, a happily arranged series of trial-boulders of approximately known age and tests.

The history of the Obelisk is naturally divided into four periods, corresponding to the four sites it has occupied: Syene (Sun-t or Assouan), where it was quarried; An (On or Heliopolis), where it stood erect for about 1050 years, and then perhaps lay prostrate for 513 years longer; Alexandria, where it stood for 1893 years; and New York, where it has fought with the elements for over 12 years, since its re-erection, January 22, 1881.

I. SYENE.

At this point, 560 miles north of Cairo, the great range of the Libyan Mountains, called the Gebel Silsilih, "Mountain of the Chain," is crossed by the Nile through a narrow gorge. Above, its obstruction of the waters of the river, with a chain, as it were, of rocky ledges, forms the famous First Cataract. In these moun-

tains, on the east side of the river, a short distance above the present village of Assouan, lie the old quarries of Sun-t ("Entrance giver") of ancient Egypt, which yielded the so-called "oriental granite," "syenitic marble," or "Thebaic Stone," out of which nearly all obelisks and colossi were cut. This was the "machet" or "mahet," "heart-stone," of the old Egyptians, so-called, it may be, on account of its hardness and durability,¹ perhaps in connection with its bright red color. For the same reason, on account of its flame-colored crystals of microcline, the Greeks afterward called it *pyropæcilon*, the fire-variegated stone.

1. *Mineral constitution of Syene granite.*

According to the observations of Russegger, as Prof. Alfred Stelzner states:

"The structure and composition of the 'Oriental granites' are very variable. Coarsely granular varieties, made porphyritic by microcline² crystals, which are distributed without regularity in the main mass, seem to be the most usual. They occur immediately in the neighborhood of Syene (Assuan). Out of these are developed locally (for instance, on the road along the cataracts of Syene) such coarsely granular masses, that the individual feldspar and quartz constituents reach the size of a cubic foot; in other places, the size of the grains diminishes, and then there results, by a parallel arrangement of the flakes of mica, a gneissoid rock. Among the varieties of composition three are especially given. That which seems to be most widely distributed is an amphibole-granite, containing biotite, in the composition of which microcline,² oligoclase, quartz, amphibole, and biotite take part. Some of the principal localities for this are the old quarries near Syene, and, besides this, Djebel Gareb and Djebel Ezzeit. This principal rock, by the gradual diminution of its hornblende, either merges into normal biotite-granite, which may be either rich in mica (east side of the hill on which the town of Syene is built) or poor in mica (Debu); or it passes, by disappearance of its quartz and the predominance of its hornblende, into normal syenite."

By the last term, Stelzner refers to the combination of microcline (or of orthoclase) with hornblende, free from quartz, to which the German petrographers now confine the name syenite. The porphyritic hornblending granite of the old quarries of Syene varies also

¹ Lenormant, *op. cit.*, 25.

² Frazer, *loc. cit.*, 367.

greatly in lithological constitution. Commonly it consists of bright red to yellowish red microcline in large twins; white oligoclase, sometimes yellowish or greenish; smoky and gray quartz; black biotite, sometimes brown or green; the last often replaced in part or altogether by black amphibole. Less commonly occur yellow mica, pyrite, magnetite, and dark brown garnet. Hematite in hexagonal or rhombic reddish plates, yellowish red titanite, colorless apatite, zircon, viridite, and yellowish green needles of pistazite have also been detected. Newbold also reports:¹ "Schorl, black and green, and actinolite are minerals occasionally found in the granite of Upper Egypt, as well as the chrysoberyl."

In the quartz, Stelzner also distinguishes capillary black needles, which I have recognized as rutile; and in its larger grains, cloud-like zones of fluid cavities, in the smaller of which the bubbles show invariably more or less motion. To this I can add, from examination of my own thin sections of rock from the Obelisk, that the fluid contents of these cavities consist sometimes of brine, sometimes of liquid carbon dioxide. Delesse attributes its smoky tint to the presence of a very small quantity of organic matter.

As to the proportion of the main constituents, the following percentage results have been reported:—

	By volume. ²	By weight. ³
Mica	4	36
Quartz	44	33
Microcline	43	} 31
Oligoclase	9	
	<hr/> 100	<hr/> 100

In my examination of the four sides of the Obelisk in 1890, while hanging in a chair from its summit during several days, I recognized, in addition to the common constituents already named, the occasional presence of magnetite, and, on the upper part of the N.N.E. face, very rare particles of pyrite, giving rise to slight ochreous rings of decomposition.

2. Distribution and condition of minerals on the surface of the Obelisk.

In examining the W.N.W. face of the shaft, black mica was found to be specially abundant, in bright scales in large part inclined about

¹ Newbold, loc. cit., 340.

² Delesse, loc. cit., 489.

³ G. W. Wigner, loc. cit.

45° toward the north. Occasional large bunches of granular hornblende occur, elongated, with their major axes inclined to the N.N.E., marking the original bedding plane of the granite. The microcline crystals are often 1 inch long by $\frac{1}{2}$ to $\frac{3}{4}$ of an inch wide, with high lustre on many fresh faces. Those of the white feldspar (oligoclase) were occasionally bright, but, in larger part, dull and whitened. However, I was rarely able to detect fine cracks in any of the feldspar, even on the old weathered surface. Near the bottom of the shaft occurs a thin seam of hornblende-gneiss, several yards in length, dipping sharply toward the north like the vein at the bottom of the E.S.E. face.

On the N.N.E. face of the shaft, the feldspar generally looked dull, except on small half inch cleavage-planes, here and there. Many masses of hornblende occur, all of dull black color, but without products of decay. A small bunch of pyritous material, nearly 2 cm. in length, was seen, blackened and dull. A large crystal of white oligoclase, 2 cm. long, was covered with a dull white crust, 1 mm. in thickness. In and around the two cartouches of the second row from the top, a large amount of hornblende occurs. At the two cartouches of the third row, below the middle of the shaft, the decay and dropping out of mica scales have caused much pitting of the surface.

On the E.S.E. face of the shaft, between the legs of the middle bull, a streak of hornblende-gneiss occurs, 10 cm. in length, with a dip of 35° to the north; others are found in that vicinity, with the same inclination. Most of the feldspar presents a waxy lustre (in part due to the paraffin absorbed during the water-proofing treatment in 1885), with occasional cleavage-planes of microcline, showing bright lustre; in places, however, below, the feldspar is often of brownish red rusty appearance. Between the two cartouches of the second row, across the body of the owl, runs a black seam of hornblende-gneiss, two feet in length. A little above a lower cartouche, in the north column, are rusty stains, like those from decomposing pyrite; the feldspar grains are sprinkled with bright red spots; and the surfaces of the oligoclase crystals are dull white and pitted. The bottom of this cartouche is crossed by a lenticular black mass of hornblende-gneiss, dipping about 40° to the north; smaller ones occur beneath. Below this, fresh and bright surfaces of oligoclase were noticed, but it was generally dull and whitened; and indeed the feldspar planes, all the way down this side, are often softer and

more inclined to powder than on the north side. At the bottom of the shaft occurs the great seam of hornblende, of which the cleft has now been partly filled with cement.

On the S.S.W. side of the shaft, at the top, the feldspar and mica appear bright on all the fresh surfaces. About a third of the way down, near the second row of cartouches, the red microcline, quartz, and mica continue to be wonderfully bright and glittering; the feldspar crystals sometimes 3 inches long by $\frac{3}{4}$ of an inch wide, and the quartz in occasional flakes, 3 to 4 inches long. A small lens of hornblende-gneiss, 2 inches long, was seen just below the pyramidion, but none further down. About 22 feet above the bottom of the shaft, the grains of quartz and feldspar are often bright, and apparently with as few cracks as in any fresh granite; the feldspar crystals are salmon-colored to pink, generally $1\frac{1}{4}$ inches long by $\frac{1}{4}$ to $\frac{1}{2}$ inch wide, and some show dull lustre. The white grains of oligoclase are here abundant, dead-white and covered with snow-white films (calcium carbonate?), forming irregular dull spots, $\frac{1}{8}$ to $\frac{3}{4}$ inch in length. Many little flakes of black hornblende here occur, apparently as numerous as those of black mica, and often surrounded by ochreous particles and spots. The scales of black mica are shining and flat, and never show curling. Along the bottom of the lowest cartouche, in the east column, near the bottom of the shaft, the black streaks consist of flakes of black hornblende. A crystal of microcline was noticed below, with pale altered edge.

In regard to the distribution of the biotite and hornblende on the four faces of the Obelisk, I found that it varies greatly, biotite in general largely replacing the hornblende. Where the latter occurs, it may be alone and scattered in grains, or intermixed and closely interpenetrated with biotite, or concentrated in large masses, often lenticular in outline, or thinning out at one or both ends into wedge-like seams. In these masses, the plates and bunches of hornblende, as well as of any biotite intermixed, are arranged in nearly parallel planes; so that, in fact, they present all the features of intermixed masses of hornblende-schist, more or less biotitic. Still further, the planes of these schist-enclosures lie very nearly parallel, so that this obelisk-mass presents to us the last stage of a transition of hornblende-schist into a gneissoid hornblendic or biotitic granite. The most extensive of these enclosures of hornblende-schist is that near the base of the shaft which forms a narrow black seam running up the W.N.W. face, and, on the E.S.E. face, has in olden time partly

weathered or fallen out and formed the well-known rift or notch¹ at the east base, partly filled and pointed with cement, at the time of the treatment of the Obelisk in 1885.

There is an interesting correspondence, in both constitution and origin, between the rocks of New York Island and those of Syene. The so-called "Graywacke Knoll," on which the Obelisk now stands, consists of biotitic hornblende-schist and gneiss, closely resembling the black seams in the monolith. This mass is crossed by a vein of coarse endogenous granite, very similar in places to that of the Obelisk itself, which is now covered by the western steps leading up to the platform; some branching seams of this granite still project on the sides of the steps. On account of this resemblance, except in the brighter red color and porphyritic character of the Obelisk-granite, a box of fragments of rubbish from this vein was kept at hand by the workmen, at the time of the water-proofing of the monument in 1885, to satisfy the constant demands of visitors from all parts of the country for specimens from the monument, and admirably answered the purpose to the gratification of both parties.

It would appear that the strongly marked bedding, apparent in photographic views of the old quarries at Assouan, and in conformity with which all the obelisks were hewn, is not, at least in all cases, the true plane of original stratification. This bedding plane is shown in the gneissoid structure of our Obelisk and now stands upright in the shaft. But, to the geologist's eye, the New York Obelisk is merely a long block of biotitic, porphyritic granitoid gneiss, in part hornblendic, crossed by seams and lenticular nodules of black hornblende-schist, whose lamination (probably signifying the true original bedding) now happens to be set up, so to speak, with a strike of W.N.W. to E.S.E., and a dip of 40° to N.N.E.

3. *Entasis of E.S.E. face of the New York Obelisk.*

While here discussing the locality and original source of the material of Egyptian obelisks, we may refer to one feature of the New York monolith to which my attention was first called by Prof. R. O. Doremus, a slight curvature, longitudinally convex, of its present E.S.E. face. On farther examination, there appeared to me, also, a very slight lateral convex curvature of the same face,

¹ Gorringer, op. cit., 12.

from each edge up to a central line; but the opposite (W.N.W) face appears to be plane and its edges straight. The exact determination of this point could not be well carried out from my unsteady position in a swinging boatswain's chair.

A corresponding curvature or entasis has already been noticed in several Egyptian obelisks. In the northern erect Obelisk of Queen Hatasu at Karnak, a decided convexity of at least one of its faces was observed by Verninac St. Maur.¹ In the Obelisk of Thothmeses III, now in front of the Church of St. Giovanni in Laterano, at Rome, of which the shaft is 105 feet 7 inches in height, the western face is slightly convex, and the pyramidal finish at the top has a small convexity on each of the four sides.² But the best known and most marked entasis occurs in the two obelisks of Luxor (of which the western is now at Paris). In each, the N.W. and S.E. sides are convex, to an extent of 0.030 and 0.035 meter³ respectively ($1\frac{1}{8}$ and $1\frac{1}{2}$ inches), at the middle of the rounding, measured from a straight line across from edge to edge. In regard to the object of this curvature, Wilkinson states:⁴ "The faces, particularly those which are opposite to each other, are remarkable for a slight convexity of their centres, which appears to have been introduced to obviate the shadow thrown by the sun, even when on a line with a plane surface. The exterior angle thus formed, by the intersecting lines of direction of either side of the face, is about 3° ." Both the Luxor obelisks, however, have also a longitudinal curvature of the same two faces, amounting to 0.020 and 0.045 meter respectively, in the Paris Obelisk, that on the N.W. face being convex and that on the S.E. concave. Hence all their longitudinal edges are convex to the N.W., *i. e.*, toward the Nile. By Prof. Donaldson⁵ these curvatures are looked upon merely as defects in quarrying, as he states: "I imagine that the first block must have been irregularly marked out and worked, and the second one compelled to follow the faulty line in the quarry."

In regard to this feature in the New York Obelisk and those of Luxor, I think it probable that at least longitudinal curvatures, especially if with corresponding concavities on opposite side of the blocks, may be but instances of tendency to curvature in splitting, commonly observed in natural joints of granite and on the longer

¹ Gorringe, *idem*, 121.

² Long, *idem*, 336.

³ Lebas, *idem*, 63.

⁴ General View of Egypt, 167.

⁵ Parker, *idem*, 33.

faces and bedding-planes of its quarries; of this some evidence seems to be shown in photographs of ledges in the Syene quarries.

It may be added that there is abundant evidence in the old quarries of Syene of the great care and economy with which the Egyptians worked their highly prized "heart-stone," and therefore of the probable good condition in which their hewn blocks were delivered ready for transport. But natural flaws occurred in the stone, and the unequal strains produced by rude methods of quarrying may have occasionally resulted in injury to some of the larger blocks, *e. g.*, the apparent cross-fissure in the famous partly hewn quarry-obelisk. Such defect may be now represented in local weakness in parts of the New York Obelisk and others, and in fractures to their pyramidia.

The most noted example was the cracked base of the western obelisk at Luxor, discovered, on the arrival of the French, by the hollow sound it yielded to a gentle blow of a hammer.¹ This caused the engineer Lebas, at the time, great dismay and embarrassment, lest he might afterwards be charged to have cracked the obelisk while lowering it from its pedestal. The main fissure was twelve feet in length, running along about one-sixth of the length of two of the faces (as now shown in photographs of the Paris Obelisk). It was "crossed by two dove-tailed mortises, filled with a yellowish dust, the remains of wooden dogs, which must have been driven in, before the erection, to prevent any possible widening of the crack."

4. *The nick in the north-northwest edge.*

About half-way up the shaft, on the N.N.W. corner or edge, a peculiar deep nick occurs, easily remarked from below, which also appears in all photographs of adjacent faces of the monolith, taken while it stood at Alexandria, previous to 1879. This seems heretofore to have escaped particular attention, doubtless because it has been considered a mere defect, like others of smaller size along that and other edges of the shaft. I had opportunity to examine it with some care, during my trips in the hanging chair up and down the adjacent sides, and found it to possess quite a symmetrical form, that of a quarter section of a hemisphere. The height of the little curved vault of the cavity is 7 inches, and the depth of its floor, measured from the angle (radius of the hemisphere), 5 inches.

¹ Lebas, *idem*, 45.

Through the rock in its vicinity small bunches of black hornblende are scattered, but none on the sides of the cavity. It does not therefore appear to be the result of weathering away and dropping out of any hornblende-mass or of other ordinary products of decay; and its outlines do not conform to the natural cleavage of the stone. Its peculiar shape, and its position—which is, I believe, exactly half-way up the shaft, suggested the possibility that it may have been an ancient artificial cut, perhaps a niche or shrine excavated for the reception of a small golden image of some deity. If so, whether this was done during the construction of the shaft at Syene, or by Egyptian, Greek or Roman, at later date, at An, can now be but a subject of conjecture. No corresponding cavity appears in photographs of other Egyptian obelisks, however, nor in that of the fellow-obelisk now in London.

5. *Decay of granite at Syene.*

A general opinion has long prevailed that the climate of Syene is one not only of extreme heat, but of unvarying aridity, and that its rocks are consequently fresh and free from any but the most superficial decay.

Thus Jomard,¹ in 1809, refers to Syene as “a place surrounded on all sides by naked and browned rocks; a burning sky, never tempered by a drop of rain. Martial has characterized in a single line this aridity and this sombre color of the ground:

‘*Sois quoties Phario madeat Jove fusca Syene.*’²

If you break off a chip from these dark colored rocks, you are surprised to see the rose-colored and brilliant tint which the fracture has revealed. You wonder whether it is the action of the air or that of the sun to which the surface owes its brown and deep color. But what could an atmosphere of perpetual dryness produce on so hard a material? And, as to the heat, one can hardly attribute this effect to it, except on the supposition of a period of prodigious length; because the hieroglyphs inscribed on these rocks for a long time are still of a quite bright rose-color.” Elsewhere he explains that the wedge-marks and hewn surfaces in the granite quarries still retain the same bright color. Lefèvre,³ in 1838, refers to the more ancient syenite forming “cliffs resembling heaps of

¹ Jomard, *op. cit.*, I, ch. ii, 61.

² Epigramm, Bk. IX, epigr. 36.

³ Lefèvre, *loc. cit.*, 144.

rounded altered blocks," and Delesse also states,¹ "Near the cata-ract, the separated blocks of syenite have sometimes a spheroidal form, and they disintegrate in concentric layers." Lieut. Newbold also reports:² "The granite of Egypt is freer from the decay, the *maladie du granit*, than that of India, arising probably from the peculiarly dry atmosphere of Egypt, which has been mainly instrumental in preserving, almost in their original freshness, its magnificent sculptures and vivid frescoes."

As to the climate, however, there is abundant evidence of past exaggeration of its arid character, and of the occurrence of heavy falls of rain, though at long intervals, as well as of the constant heavy dews. These render it certain that the action of water in erosion, infiltration, and hydration has ever played a slow but important part in effecting decay of the rock in that region.

For example, Lepsius relates, in his account of travel through Egypt, that he encountered at Assouan a violent thunder-storm, with heavy rain, which afterwards rolled down the Nile valley for nearly 600 miles, as far as Cairo.³

Concerning the Libyan hills, Ebers also states:⁴ "From time to time—rarely indeed, and in most cases only once a year, in the winter months—dark storm-clouds gather around the heads of the mountains; and soon the rain pours down with such violence, on the hill country, that it seems as if all the collected vapors of the year were being restored to the earth in one tremendous torrent. The brooks and cascades that tumble down the rifts and crevices in the mountains collect in the valleys; the streams form a regular system of little rivers; and at last, gathering in one main valley, the flood rolls on, either slowly and majestically, or vehemently, ruining all it meets with on its way, till it loses itself in the Red Sea or the Nile."

Further data on this subject are given beyond, in the notes on the climate of Alexandria (Section 11).

It is also apparent, by a study of views and photographs from this region and of references to its scenery by passing travellers, that the picturesque character of the vicinity of Syene is mainly due to the extent and character of general rock-decomposition which there prevails. Thus Denon,⁵ in 1802, describes the scenery

¹ Delesse, loc. cit., 488.

² Newbold, loc. cit., 340.

³ Lepsius, *Letters from Egypt*, 119.

⁴ Ebers, op. cit., II, 333.

⁵ Denon, op. cit., 83.

near the First Cataract: "These mountains, all bristling with black and sharp projections, cast their sombre reflections in the waters of the stream. . . . After passing the cataracts, the rocks grow loftier, and, on their summit, blocks of granite are heaped up, appearing to cluster together and to hang in equipoise, as if with the purpose of producing the most picturesque effects. Through these rough and rugged forms, the eye all at once discovers the magnificent monuments of the Island of Philæ." Miss Amelia B. Edwards¹ also refers to the same scene: "Perhaps the most entirely curious and unaccustomed features in all this scene are the mountains. . . . Other mountains are homogeneous and thrust themselves up from below in masses suggestive of primitive disruption and upheaval. These seem to lie upon the surface foundationless; rock loosely piled on rock, boulder on boulder; like stupendous cairns, the work of demi-gods and giants. Here and there, on shelf or summit, a huge rounded mass, many tons in weight, hangs poised capriciously."

The peculiar features which mark an extensive, deep and long continued decay of rock in place are well shown in the accompanying illustration, from a photograph made by my friend, Dr. H. Carrington Bolton, of a granite-cliff about 2 miles south of Syene (Pl. IV). We have here all the indications of a slow decay, progressing most rapidly along the planes of bedding and jointage, also eating out the latent lines of shrinkage and weakness, and so dividing the whole mass into angular fragments, with slight adherence, only remaining in place by gravity, like the boulders in a stone-wall. Exfoliation has partly rounded the angular blocks at their corners and edges, even in position; while those on the crest, and those that have rolled out into full exposure to sun and to night-radiation, have been largely rounded off into true boulder form.

[At this point a series of recent photographs was exhibited, including the following: View of the First Cataract from the S.W., with deeply etched and roughened boulders and tops of columns, on the crest of the cliff in the foreground: View of an old watch-tower near Syene, showing horizontal bedding and strong joints in the cliff, and several well rounded boulders, with surface scaling off in successive coats: Frith's view of Philæ, from the head of the cataract, on the north, showing the deep erosion of the strong joints,

¹ Edwards, op. cit., 231.

and etched surfaces of rounded boulders, near the level of the river: Views from Philæ to the N. and to the S.W., showing development of columnar structure by the decay, in the direction of the strike, and formation of elongated boulders: Views of Philæ from the E. and from the S.W., showing the eroded columns of "Pharaoh's Throne," rounded ledges, with hard seams (of quartz?) projecting above the eroded surfaces, and huge exfoliating boulders.]

These forms are so familiar to the geologist's eye, as characteristic of rock-decomposition in a climate of heavy rainfall and winter frosts, that it is at first hard to believe that these occur in one of the most arid regions on the globe, where frost is unknown. The topographical features suggest the probability that, throughout the entire upper stratum of granite, to which the Egyptian quarrymen were compelled to limit their exploitation, not exceeding a thickness of 60 or 70 feet, the stone was already quite uniformly affected by a kind of "dry rot." Further light on this matter will be presented beyond, in physical tests made on the freshest stone I have been able to procure from the Assouan quarries.

To Villiers Stuart¹ we owe an archæological observation at the First Cataract, whose geological importance seems to have been overlooked: "We landed at the island of Schael, just below the falls, to examine the inscriptions on the rocks; they are very numerous and curious, and extend over a period of 2000 years. The earliest we saw was of Ousertasen the Third, of the XIIth dynasty (2200 B. C., Lepsius) . . . There is a special interest about Ousertasen's, for it was inscribed while the Nile was still at its original level, 23 feet higher than now; and accordingly it stands high upon the rocks. . . . They are all cut in granite, and Ousertasen's showed its great age by the fact that a process of decay in the granite itself had set in, the once polished surface being corroded and eaten by the tooth of time, and the outlines somewhat blurred. High up among the loftiest rocks of the island, however, I found another inscription and a statuette cut in bold relief in a niche which must have been much older even than Ousertasen; the granite had so entirely decayed that the features of the statue had dissolved and were undistinguishable. There were many lines of hieroglyphics in like manner quite decayed and illegible. No clue therefore existed to the date except the condition of the stone,

¹ Nile Gleanings, 203.

which, though in a sheltered angle of the rocks and less exposed than Ousertasen's, was much further gone. It may have been of the Pyramid period" (IVth dynasty, 3124–2840 B. C., Lepsius). This would involve an exposure of 50 or more centuries.

On the other hand, Delesse states:¹ "In the Egyptian Museum of the Louvre, the feet and the head of the colossal statue of Amenophis III, as well as a large number of sculptures, which, under the perpetually pure sky of Egypt, have not experienced any alteration during the greater part of the time, have even preserved the most perfect polish after nearly 4000 years."

From all these observations at Syene, the following conclusions may be drawn:—

(1). The predominant destructive process has not been external, such as disintegration by the heat of the sun, attrition by sand whirled by the wind, etc.; here, as elsewhere, these have played a secondary part. A certain degree of polish has been produced on the surface of ledges by sand-attrition, by occasional heavy rains, and by the mud-laden waters of the Nile up to the limit of its flood-line.

(2). The main process has been one of internal decay, most efficient along the joint- and bedding-planes of the granite, even to the lowest depths now observable, and producing long columnar masses. The chemical decay and disintegration have also seriously attacked the irregular planes of contraction and eaten them out into an irregular network of fissures, which mark the latent lines of weakness throughout the material, and divide it into angular blocks.

(3). The gradual decomposition of the ferruginous silicates over the surface of the ledges (biotite, hornblende, and the feldspars) has left their feebly soluble bases, in this arid climate, as a polished black crust of iron and manganese oxides. The other more soluble and finer products of decay have been removed by occasional rains and constant action of the wind.

(4). The outer forms assumed by the cliffs largely indicate their variation in materials and in their resistance to decomposition and erosion: the projecting masses consist of the more compact kinds of granite and porphyry, and even thin projecting seams and nodules of quartz: the hollows and fissures, of softer granite and of intercalated seams of hornblende-schist. A considerable internal expansion of material is shown by the general scaling of the surface and

¹ Delesse, loc. cit., 490.

rounding of angles and edges. The predominance of these rounded forms in loosened and isolated blocks, and in the projecting tops of columns, probably signifies the efficient help of the heat of the sun and of alternations of temperature.

(5). As to the amount of degradation of the surface, we may probably get some estimate through the observations of Stuart on the effacement of the older hieroglyphs on the island of Schael. Since the ordinary depth of such carvings is from 2 to 4 centimeters, we may infer that the granite has decayed in these places, during the period which has elapsed since their execution, from 40 to 50 centuries, to the depth of at least 1 centimeter and perhaps over 2 centimeters.

It must always be a subject of regret that Commander Gorringe, during his stay at Alexandria for the removal of our Obelisk, was not able to visit this region and to become impressed with the universal and deep decay prevailing throughout this durable rock of Syene. In that case, it is probable that he would not have replied, as in 1880, to a suggestion of the need of the New York Obelisk of protection from the weather by some preservative: "It has lasted nearly 4000 years and will probably last 4000 more. I think we need not trouble ourselves about it." It was but a repetition of the mistake of his predecessor, Rameses II, who, in his invocation to the gods, recorded in the poem of Pen-ta-our, alludes to the "eternal stones" which he has erected in his temples to their honor.

II. AN.

The next step in the history of our Obelisk was its conveyance from Syene to the ancient city of An (or Heliopolis, as the Greeks called it), near the site of the present Arab village of Mataria, about 6 miles N.E. of Cairo.

6. *Position of our Obelisk at An.*

This city of An was built upon a somewhat raised, artificial platform, extending over an area (according to Mariette-Bey) of about 4560 by 3450 feet. Here our Obelisk, together with its companion, now in London, was raised before the Temple of the Sun by Thothmeses III of the XIXth dynasty, about the year 1600 B. C. As

¹ Report on Condition of Obelisk, 4.

to the situation of the great Sun Temple, and of the great gate or propylon standing before it, archaeologists agree in assigning it to the western part of the city, toward the Nile and the setting sun. The English traveller, Pococke, in 1743, traced out the boundaries of the mounds, as indicating the outlines of the ancient city. Brugsch, however, maintains that these mounds show only the limits of the walls of the temple, and are themselves but the remains of the walls of a Coptic town which occupied the site of the temple, a few centuries before our era.

The temple was specially devoted to Atum-Ra or Tum, the God of the Setting Sun. Before the great propylon, in approaching it from the west, rose a pair of Obelisks of Usertesen I of the XIIth dynasty, probably erected about 2300 B. C., fully 700 years before our own monolith. Pococke located these almost opposite to the passage through the mounds which he considered to be the west city gate, but a little more to the south. One of the pair fell in 1160 A.D., having been undermined by treasure-hunters, and has long disappeared. It was perhaps last seen prostrate in 1753 A.D., by Robert Clayton;¹ of the present erect shaft, Savary stated in 1787, "this and one sphynx of yellowish marble, thrown in the dust, are the only remains of Heliopolis."²

Passing next through the propylon and between two rows of marble sphynxes, the temple itself was reached, with two pairs of obelisks before it. The pair next the portal of the temple was the more ancient, consisting of the monolith which now stands at Constantinople (the Atmeidan Obelisk, with its lower end broken off, but still $55\frac{1}{2}$ feet in height), and of a missing companion, of whose fate nothing is now known. The outer pair consisted of the obelisk now at London, on the right (S.W.), and of our own Obelisk on the left (N.E.).

7. *Orientation of sides of our Obelisk at An.*

In regard to the position in which the sides of the Obelisk were then placed, a consideration of the inscriptions within the pictured squares on the four faces of the pyramidion throws some light. In those of the present N.N.E. and E.S.E. faces,³ the King Thothmeses is represented in the form of an androsphynx, worshipping the God of the Rising and Noon-day Sun, *Hor-Khuti-Ra*. In the

¹ A Journal from Grand Cairo, 7.

² Savary, op. cit., I, 123.

³ Moldenke, op. cit., 54 and 47.

pictures of the S.S.W. and W.N.W. faces¹ of the pyramidion, the object of the king's worship is Atum-Ra, the God of the Setting Sun, to whom the Sun Temple at An was specially dedicated, at least during and after the XIIth dynasty, by the re-builder of the sanctuary, Amenemhât I. In harmony, therefore, with the purpose and custom of the sun-worship, the former two faces must have been originally so placed, on the erection of this shaft at An, as to have been lit by the rays of the rising sun, and the latter two, by those of the setting sun. The similar pictures on the pyramidion of the London Obelisk intimate that its faces were arranged in a corresponding position. Indeed the same key to the position of their faces is afforded by the similar pairs of pictures on the faces of the pyramidia of several other obelisks.

A more definite indication is probably shown in the position of the faces of the present Obelisk of An, which probably stood in front of the pylon of the Sun Temple, at a site more westerly than that of the New York and London obelisks. As to this, Niebuhr has noted that its angles are now directed to the S.S.E., N.N.W., E.N.E., and W.S.W.² Archæologists, however, have pointed out the evidences of a historical catastrophe, in early Egyptian history, unrecorded in the inscriptions, during which, perhaps by a great revolution or invasion, all the monuments, temples, and obelisks of Lower Egypt were overturned; some writers attribute it to invaders, such as the Hykshos, 2398 B. C.³ Some of the monuments have ever since lain prostrate, *e. g.*, the stela of Begig of Usertesen I, in the Fayoum. Others, like this Obelisk of An and its former companion, were afterwards re-erected by the Egyptians. Their ancient low pedestals, consisting of a layer of sandstone blocks, had been probably undisturbed, and probably guided their re-adjustment in their former and proper position. The evidence of this surviving obelisk on the site of An is therefore that the front of the pylon, the façade of the Sun Temple beyond, and the corresponding western faces of all its six obelisks (if Niebuhr's observation is exact), faced to about W.N.W., *i. e.*, W. 22° N.

We have evidence, in the ancient documents, of a ceremonial attending the foundation of an Egyptian temple, which signified a deliberate design as to the direction in which it was to be laid out;

¹ Moldenke, *idem*, 50 and 52.

² Long, *idem*, 316.

³ Cooper, *idem*, 17.

in this, the King and the God are represented holding stakes upright between them, around which a looped cord is drawn tightly, so as to indicate a definite direction; along the line then shown by the stakes, driven into the ground, a boundary wall of the new temple was erected. In an inscription dating over 2000 years B. C., this ceremonial is related concerning the foundation of this very Sun Temple at An, by the founder of the XIIth dynasty, Amenemhât I, and his son and co-regent, Usertesen I, who afterwards set up the present Obelisk of An:

“Arose the King, attired in His necklace and the feather-crown;
All the world followed Him, and the Majesty of Amenemhât.

The Kolchyt read the sacred text, during the stretching of the
measuring-cord and the laying of the foundation-stone on
the piece of ground selected for this temple.

Then withdrew His Majesty Amenemhât;

And King Usertesen wrote it down before the people.”

As to the intent of the particular direction given to the measuring-cord, we now have a satisfactory explanation through the investigations of Nissen, in 1885,¹ and of Lockyer (op. cit.) in 1891. The varying courses of the axes of different Egyptian temples appear to have been directed to points on the horizon which marked the periodical rising or setting of the sun, moon, or certain stars, particularly at the summer and winter solstices. The apertures in the huge pylons and in the series of separating walls and portals beyond, toward the Holy Place, exactly represent the diaphragms in the modern telescope, and were intended to keep the light pure, from the luminary rising or setting on the horizon, and so lead it directly into the sanctuary at a definite moment. A solar temple was therefore so oriented to the horizon, at a solstice, that, either at sunrise or at sunset, the light of the sun should pour along the axis from end to end. Several of the solar temples were thus directed toward the point of the setting sun at the summer solstice, when the day was longest; and to this class, of course, must have belonged the Sun Temple of Atum-Ra at An. There, once a year, past its double emblem before the pylon, the pairs of obelisks, the sunbeam sped through the huge portal, through the double line of sphynxes and the colonnade of temple-columns, through opened doorways and parted curtains, and flashed through the portal of the dark Holy of

¹ Rheinisches Museum für Philologie, 1885.

Holies as a glittering spot of light upon the end-wall—for a few moments only, it may be, and then vanished away. So began the first day of Thoth, the first month of the Egyptian year. The orientation of the axis, over a quarter mile in length, of the magnificent Solar Temple of Amen-Ra, at Karnak, has been determined with an amplitude of W. 26° N.,¹ and that of Abydos, W. 27° N. The latitude of Karnak is about 26° N., and that of An about 30° N., which (according to an approximate calculation made for me by Prof. J. K. Rees, of the Astronomical Observatory at Columbia College, New York) would add about one degree to the amplitude of the sun-setting point at the summer solstice.

Although, therefore, not a single stone remains of the ancient Sun Temple of An, it appears quite certain that its axis was directed to W. 27° N., and to that point faced the front side of the New York Obelisk, over thirty-five centuries ago.

8. *The mutilation of the Obelisk by fire.*

After standing, probably undisturbed, for about 1050 years, the Persian Invasion of Egypt occurred, during which, about 525 B. C., the city and Temple of An were destroyed, as related by the geographer Strabo,² who visited Egypt 24 B. C.:

“There, too, is Heliopolis, situated on a large mound. . . . At present the city is entirely deserted. It has an ancient temple constructed after the Egyptian manner, bearing many proofs of the madness and sacrilegious acts of Cambyses, who did very great injury to the temples, partly by fire, partly by violence, mutilating in some cases and applying fire in others. *In this manner he injured the obelisks*, two of which that were not entirely spoilt were transported to Rome. There are others, both here and at Thebes (the present Diospolis), *some of which are standing, much corroded by fire, and others lying on the ground.*”

There are two reasons for believing that our Obelisk and its companion would particularly attract the fierce indignation and attack of the Persians, perhaps above all the others which gave to the city its name of the “City of Obelisks:” first, their prominent position before the façade of the Temple of the Sun: secondly, the names of the two kings repeatedly inscribed in cartouches, among the hieroglyphs over every side of these two shafts.

¹ Compare Map No. 1, Wilkinson, Thebes and Pyramids.

² Book XVII, i, 27.

To the westward, for reasons before explained, the present W.S.W. angle of our monolith must have been directed, so that, to one who approached the Temple, the inscriptions on the present S.S.W. and W.N.W. sides first became visible. This conspicuous position might have been sufficient in itself to invoke the special fury of the destroyer. But to this must have been added the intense hatred of the Persian toward the two warlike and ambitious monarchs of Egypt, Thothmeses III and Rameses II, who had both in succession, at an interval of two centuries, not only extended the sway of Egypt over Persia, but had subjected the native land of the present invader, Cambyses, to special cruelty and humiliation. We may then fairly infer that the fires must have been the hottest and longest continued, and the utmost efforts at mutilation most persistent, toward this Obelisk and its mate, on which the cartouches of these Pharaohs, constantly repeated and glittering with gold, caught the Persian eye. Such fires would be specially kindled and fed on the two prominent faces of our Obelisk, above designated. The lesser injury to the Obelisk of Usertesen, before the pylon, is thus explained, reaching merely for a few yards above its base.

What evidences of such violence, then, still remain upon our own Obelisk?

(1). The strange condition of the pedestal. It has probably resulted from the envelopment of the bases of nearly all the obelisks, in Upper Egypt, by sand, as at Luxor and Karnak at Thebes, and, in Lower Egypt, by mud from the overflow of the Nile, that but little is known in regard to their pedestals.

At Luxor, the excavation of the bases of both the obelisks of Rameses II, which preceded the removal, by the French engineer,¹ of the western obelisk to Paris, revealed, beneath each shaft, an elaborately sculptured granite pedestal, resting upon a platform of three blocks of sandstone. The monolithic pedestal (see figure in my paper, *Misfortunes of an Obelisk*, loc. cit., page 90), which originally stood under the western obelisk and was left behind by the French, was decorated with figures of pairs of cynocephali or apes (representing the god of wisdom, Thoth) on two opposite sides, and, on its face, with figures of the Nile god, Hâp, presenting offerings to Thoth, and with rows of hieroglyphics, once probably filled with gold; this block was 2 6 meters (10 feet) in height.

¹ Lebas, *idem*, 71.

The other pedestal, beneath the eastern obelisk of Luxor, and now buried in sand twenty feet deep, out of sight, was 3.4 meters ($11\frac{1}{2}$ feet) in height, sculptured and decorated in the same way.

At Karnak, the standing obelisk of Queen Hatasu, the sister of Thothmeses III and his predecessor on the throne, has a low square pedestal, whose sides are covered with rows of hieroglyphs, also probably filled with gold like those on the shaft above.¹

The Corfe Castle Obelisk, formerly on the Island of Philæ, has a sandstone shaft, 22 feet and $1\frac{1}{2}$ inches in height; its sandstone pedestal is 5 feet 9 inches in height, and covered with Greek inscriptions of Ptolemy Euergetes II, in part cut in the stone, and in part painted upon it, or, according to Cooper, originally written in letters of gold.²

The Obelisk of An, according to Lenormant, stands upon a simple foundation, now buried several feet beneath the Nile silt, consisting of two broad steps or slabs of sandstone, each about 2 feet high;³ but, on account of its ancient disturbance, we have no certain knowledge concerning its original support.

In regard to the Campensis or Monte Citorio Obelisk, at Rome, which the Romans tried to use as a sun-dial, it was stated in 1803, "there can still be seen at Rome the original pedestal of the horary obelisk overturned on the Campus Martius," and also that there was in the Vatican "a granite base cut with a cavity, probably to receive an obelisk."⁴

Note the singular fact, however, that we find the huge granite pedestal of the New York Obelisk devoid of sculptures, inscriptions, or even polish; its sides approximately even, but with roughened surface; its edges and angles nicked and uneven; its corners greatly rounded off; and many large spots, showing internal cracks by their hollow sound, when lightly tapped. Yet the shaft above shows amusing evidences of the struggle of two successors of Thothmeses III on the throne of Egypt, Rameses II and Osarkon I, to find sufficient room on which to record their inscriptions of self-appreciation; while apparently there were over 220 square feet of blank space waiting for glory on the pedestal below. It seems more than a probability that this pedestal, in its original condition at An, was completely covered with hieroglyphs

¹ Lepsius, *Denkmäler*, Plate 24.

² Gorringer, *idem*, 139.

³ Gorringer, *idem*, 123.

⁴ Quatremère de Quincy, *De l'Architecture Égyptienne*, 198, 108.

and sculptures, like those which Rameses II had carved upon the pedestals of his fine monoliths at Luxor: that their entire disappearance, succeeded by a roughened surface, points to the violent mutilation and fire of the Persians: and that, at the time of its transfer to Alexandria, the Romans were content to dress the damaged faces somewhat, to an even surface, rather than to cut new figures or hieroglyphs into the hard granite; of their poor work in imitation hieroglyphs, they have left us samples in some of their own obelisks at Rome.

A corroborative fact is found in the pedestal of the fellow-obelisk, which the English left buried in the sand at Alexandria. As this consists of limestone, it seems likely that the original granite pedestal of that shaft at An was found by the Romans so badly injured or destroyed, that they replaced it at Alexandria with a block of the easily hewn and abundant material, limestone, from the quarries beyond the Nile, adjacent to Heliopolis, at Masara or Turra.

(2). The extreme mutilation of the bases of the two shafts (and these only, of all Egyptian obelisks), particularly at their corners. These are so greatly and irregularly rounded off, that Gorringer estimated that not over two-thirds of the area of the bottom of our Obelisk could come into contact with its pedestal. So great is the rounding on the heel of each shaft, that one old writer, in 1738 A.D., describes it as hemispherical, fitting into a corresponding cavity or hollowed-out socket in the pedestal, and states: "but the Basis or Foot may perhaps be the most remarkable Part of these Obelisks, especially if that at Alexandria is to instruct us. . . . They would bear a nearer resemblance to Darts and massive Weapons, thus more expressive of Rays of the Sun."¹

As Gorringer states, "that marring of the heel, to the extent of breaking off large masses at the corners, cannot be attributed to the present age. The fractures are also too irregular to admit the theory that they were purposely broken off to facilitate the operation of raising the Needle."² The mutilation must have occurred before the erection of the Obelisk at Alexandria, since the Romans then found it necessary to introduce their bronze crabs as supports beneath the four corners. According to one author, "one effect of the removal of the obelisks by the Romans was to break off the

¹ Shaw, *op. cit.*, 411. Also Pococke, *op. cit.*, I, 7.

² Gorringer, *idem*, 102.

edges at the bottom. . . . During the transportation, a large portion of the edges at the base was very badly damaged.”¹ Such rude and clumsy handling, however, is not likely, in view of the known skill of the Roman engineers: their experience twelve years before, according to Strabo, in conveying a pair of obelisks from An to Rome: and the perfect condition of the bases of the Egyptian monoliths now in Rome, and, in fact, that of the delicate pyramidion of this very Obelisk. The mutilation must have occurred at An, and it is significant that it occurs, in both obelisks, in just that part of the shaft which must have been most exposed to the fire. If the obelisks were then overturned, the injury may have been intentionally increased by mechanical violence.

It is also highly probable that the destructive action of fire was aided by dashing cold water upon the heated stone, as far up as it could be thrown from below, a method of destruction of rock well known to all the ancient nations, and commonly used in their mining.

(3). The partial to complete obliteration of a large portion of the inscriptions on all sides of the base of the shaft, with a peculiar smoothing of the surface, up to a height of 10 or 12 feet above the top of the pedestal. The upper limit of this, the so-called “sandle-line,” running horizontally around the shaft, begins on the N.N.E. side, about half-way between the two lowest rows of cartouches. In addition to the effacement of hieroglyphs, the peculiar even and shining surface should be noted, which is, to a large degree, free from the pitting, often deep, which covers the surface of the shaft above the line. On the E.S.E. and S.S.W. faces, the same rounding of corners and of edges of the hieroglyphs occurs. But on the W.N.W. face, many sharply carved intaglios remain but little injured, near the bottom of the shaft and for a yard above; thence the same rounding and partial effacement of characters extend up to the same line. All these facts point to an ancient destruction of the lower surface of the shaft by some agency which left it covered with smoothly cleaved planes and broken corners, and to a subsequent protection of the smooth surface from the weathering which caused the pitting above the line.

It is known that at least as far back as the visit of the traveller, Paul Lucas, to Alexandria, in 1714 A. D., the shaft was buried in

- ¹ Moldenke, *idem*, 20, 39.

sand up to the height of 12 feet, and to its action the obliteration of the characters has been attributed by some, the upper limit having been denominated the "sand-line." But envelopment in sand has served usually, in Egypt, as the best protection. Thus it is stated of two of the most ancient obelisks discovered, those of King Entef of the XIth dynasty, over 2400 B. C., "the hieroglyphics in these obelisks were very well preserved, owing to the friendly protection of the sand beneath which they were buried."¹ The same protection of hieroglyphs, on the under side of the fallen obelisk at Alexandria, was noticed at the time of its exhumation in 1801. The same fact may be even more strongly shown in the remarkable preservation of the Greek and Latin inscriptions upon the bronze-crabs, during nineteen centuries, among whose characters, only partly filled with metallic oxides, the keen eye of our American archæologist fortunately detected the important lost numeral.²

The upper line which bounds most of the obliteration seems to me therefore, perhaps, to mark the highest limit of the most intense flames of the fires at An, and more surely the limit of protection of this smoother fire-flaked surface, from much subsequent erosion and pitting by the weather and drifting sands, during its envelopment to that depth.

(4). The belts of obliteration which stretch up the S.S.W. and W.N.W. sides of the shaft, uniting in the cracked W.S.W. corner. This effacement of hieroglyphs has been attributed to several causes.

(a). *The damp climate and sea-breezes*³ of Alexandria This will be discussed beyond, where it is shown that the side which then faced the Mediterranean is the present E.S.E. side, on which the inscriptions remain in excellent state of preservation.

(b). *The long continued action of the sun.* This view appears at first the more plausible, since it is probable, for reasons already given, that the badly injured W.N.W. and S.S.W. faces did really stand at An for about 1050 years, as they do now, in full exposure to the afternoon sun. But the present N.N.E. side faced the sun afterwards still longer, at Alexandria, for 1891 years, to the W.S.W., and is the best preserved of all the faces. Nor has such injury been noted on any other of the obelisks, constructed of exactly the same granite, which have stood, in the same climate, at An and at

¹ Stuart, Nile Gleanings, 273. Long, idem, 302.

² Merriam, loc. cit.

³ Clark, op. cit., 31.

Thebes, for still longer periods. The present Obelisk of An has remained on its site, only a few rods distant from that of our Obelisk, for at least 700 years longer, since about 2300 B. C., and the condition of its surface may throw light on the present question. In 1743, a traveller reports:¹ "It is discolored by the water to the height of near seven feet. It is well preserved, except that, on the west side, it is scaled away for about fifteen feet high."

In 1755, Capt. Norden states:² "I have represented the western side of this obelisk, because it is the best preserved. I should further state that the bottom of the obelisk on the east is almost entirely ruined, to such an extent, that almost no trace of a hieroglyph can be distinguished upon it."

In 1787, Savary remarks:³ "The obelisk is in good preservation except toward the southwest, where the granite is chipped to a certain height." These travellers show the usual careless designation of the decayed side; Niebuhr found that the sides faced N.N.E., E.S.E., S.S.W., and W.N.W. No evidences of present decay and scaling are on record, after an exposure of 43 centuries.

As to the obelisks at Luxor, erected about 1350 B. C., before the pylon of that Temple, and fronting N.W., Pococke reported:⁴ "The hieroglyphics are cut in with a flat bottom, an inch and a half deep; and the granite has perfectly retained its polish, which is the finest I ever saw. . . . They are exceedingly well preserved, except that about half the pyramid of the western obelisk is broke off, and the southwest corner of the eastern one is a little battered for about six feet high." The one still at Luxor, and also that of Queen Hatasu at Karnak, remain renowned for the perfect sharpness and exquisite polish of their hieroglyphs, even on the sides which have faced the afternoon sun, undisturbed, for 32 to 35 centuries.

In regard to the stela of Begig, in the Fayoum, which lies, fallen and broken, about 43 feet in length, erected also by Useresen I, Pococke observed,⁵ that "the obelisk is much decayed all around, for ten feet high, but mostly on the south side; the west side is almost entirely defaced."

(c). *Attrition by the whirling sands of the desert.* On this, a writer remarked, in 1847: "The obelisk that is still erect among the ruins of Alexandria retains much of the freshness, sharpness,

¹ Pococke, *idem*, I, 23.

² Savary, *idem*, I, 123.

³ Long, *idem*, 319.

⁴ Norden, *op. cit.*, I, 104.

⁵ *Idem*, I, 107.

and high polish of its first execution on its north and east faces; but the minute particles of sand with which the air is charged, in passing over the desert, have entirely defaced its south and west sides, by beating against it during the 1600 years in which it has stood in its present position."¹

In favor of this view is the fact of the greater injury on the present S.S.W. and W.N.W. sides, those which fronted the Khamseen, which, in Egypt, blows at intervals from the S. and S.W., driving fine sand, though seldom for more than a day in duration.²

But, even on these sides of the shaft, the deepest injury is at the upper part of the W.S.W. corner, most out of reach of flying sand, and of a different character from the superficial erosion effected by that agency. It was only during the last few centuries that the obelisks have been exposed to sand at Alexandria, having been previously protected within the wall of the city; while, at An, the sands of the desert have never reached their site.

The excellent condition of the partially sand-enveloped obelisks of Thothmes I and of Hatasu at Karnak, and of Rameses II at Luxor, show how limited is the erosion attributable to this agency, as well as to the heat of the sun, on Syene granite, during long periods.

(d). *Disintegration by nitrous efflorescence.* Injurious action of this origin was noticed in 1809 by Hamilton,³ on sandstone from the quarries at Hadjar Silsilis: "The rock, in which these quarries have been excavated, is a very uniform, compact granular sandstone, enclosing sometimes ligneous petrifications. It is extremely hard when exposed to a dry climate and a warm sun, but easily softened by rain, so as to be damaged when moist by whatever touches it too rudely. The exterior of those temples which have been built of it preserves a very clear sandy color; but the walls of the inner apartments are blackened by the confined damp, and by the action of the nitre with which the air is impregnated. In these rooms, the surface of the stone is easily detached in thin flakes."

In his study of the Great Temple at Karnak, Mariette-Bey observed, in 1875: "Every year the river penetrates it by infiltration, and, uniting with the saltpetre with which the soil is impreg-

¹ Osburn, op. cit., 49.

² Rawlinson, Hist. Anc. Eg., I, 46.

³ Hamilton, op. cit., 85.

nated, corrodes and eats away the foundations of the monument. The Grand Temple holds itself up, only because it is supported by the soil in which it is plunged. Naturally there is not a temple in Egypt where the fall of walls happens more frequently.”¹

Elsewhere, he repeats: “For many years the grand Temple of Karnak has been assailed, more than any other Egyptian temple, by the infiltration of the Nile, whose water, saturated with nitre, eats away the sandstone;” and again, “Karnak has found its principal enemy in the nitre that corrodes the base of its walls.”²

Dr. Rossiter W. Raymond has also called my attention to the deep disintegration and scaling away which he observed at the bases of the great pillars in this Temple, and which can also be readily distinguished in some photographs. My brother, Rev. Matthew C. Julien, recently in Egypt, informs me that he also observed the same scaling on the vertical walls at the entrance of the Serapeum.

There can be no question of the decay and serious damage which have been caused, in Egypt, as elsewhere, by efflorescent salts, but, in that country, only on porous sandstone, in enclosures whose soil is saturated with these salts in the immediate vicinity of filthy Arab villages, and to a height of but a few feet above the ground, rarely over a yard.

Therefore, although an early description of ancient Alexandria refers to its “battlements decayed and the stones corroded and disfigured by saltpetre,”³ there is no evidence nor probability of any granite obelisk having suffered exfoliation from this agency.

(e). *Erosive solution by the Nile-waters or Nile-mud.* This theory, often suggested, of attack by the Nile-waters, or by organic acids of the rich black soil of the Land of Cham, I think, has not been supported by observed facts. No such decay surrounds the shaft of the Obelisk of Heliopolis. Its base was found, by the French expedition in 1807, to be buried in the alluvial plain to the depth of 1.88 meters⁴ (6 feet, 2 inches), of which Wilkinson found that 5 feet, 10 inches had accumulated during the last 1700 years. The actual rise of the waters was found to have reached 1.52 meters higher (5 feet), but no corresponding band of exfoliation is noted.

Nor have the carved flutings and hieroglyphs suffered in sharpness, on the colossal statue of Rameses II, once erected before the

¹ Karnak, 7.

² Monuments of Upper Egypt, 180, 197.

³ Volney, op. cit., I, 5.

⁴ Histoire Naturelle, Texte, I, 407.

Temple of Ptah at Memphis, which has since lain buried in the Nile-mud, face downward, for over twenty centuries, until its recent exhumation near Cairo

Even though we grant, in the absence of proof, that our Obelisk was overturned in the destruction of the Temple at An, about 515 B. C., it seems impossible that five centuries of burial in the soil could have effected the damage we now see upon its faces.

(f). *The burning of the stone by the Persians.* This appears to me the only satisfactory theory to account for the great injury to the S.S.W. and W.N.W. sides of the shaft. The fiercest flames of the Persian fires, naturally kindled at the most prominent W.S.W. angle, seem to have licked up the adjacent faces, and were probably aided by throwing water upon the heated stone. With the flaking away and fall of the lowest of the hated cartouches of Thothmeses and Rameses from those sides, and the blackening of the rest, the Persian vengeance was sated.

A consideration of all these facts has led me back to the old view, which was thus readvanced, some years ago, by Dr. W. C. Prime: "It is hardly to be questioned that this ancient destruction of the surface was due to the fires of Cambyses, before the stone was transferred to Alexandria. It is probable that, when so transferred and erected in front of the Sebastion, the best preserved side was placed in front, facing the sea. That the monolith was once subjected to severe fire, especially affecting the lower part, and more intense on one side, seems very probable."¹ If also overturned and prostrate for five centuries, as some believe,² it may have so fallen as to have buried its present N.N.E. and E.S.E. sides, with its summit under the sand, its heel exposed to mutilation, and its present S.S.W. and W.N.W. sides mainly uncovered to the action of the weather, down to the line now marked by the preserved eastern column of hieroglyphs on its present S.S.W. face.

Our conclusion also confirms that of Denon, at his examination of the two obelisks in 1801: "Inspection of the actual condition of these obelisks, and the fractures which existed at the very time when they were erected on this site, prove that they were already fragments at that period, and transported from Memphis or Upper Egypt."³

¹ N. Y. Journal of Commerce, Dec. 16, 1889.

² Gorrington, *idem*, 72.

³ Denon, *idem*, I, 33.

III. ALEXANDRIA.

In the year 12 B. C., the New York Obelisk and that of London were conveyed by the Romans to Alexandria, probably on a float through a canal and down the Nile, and re-erected near the seashore on the New Port, to ornament the approach to the Cæsareum or Sebastion. There is little likelihood that they suffered any injury while in the care of the skilful engineers of a nation so experienced in the handling of architectural materials, a care exemplified by the elaborate bronze crabs devised and introduced under each shaft, to ensure its permanent support and safety.

The substitution, already suggested, of a limestone pedestal for the ruined granite block which probably supported the London Monolith at An, suggests also that the present limestone foundation of our own Obelisk, with its various enclosures and the substratum of sandstone blocks, may not be of the same age as the pedestal and shaft above, but more likely Roman. Limestone has been the easily quarried, abundant, convenient, and cheap building-stone of Lower Egypt, in all ages; and the limestone blocks in the three tiers of the foundation retain a suspiciously new look and wonderfully sharp arrises, to have passed through the fires and mutilation of An.

9. *Position of Obelisk at Alexandria.*

On its new site, it was shaken by at least the two recorded earthquakes of 1301 and August 8, 1303, A.D., one of which was sufficiently violent to hurl down its companion. Later, it shared with the city, but apparently without harm, its varied experiences in insurrection, siege, and sack, and remained in the same place undisturbed until the close of 1879. Frequent references are made to it by passing travellers and visitors, such as Abd-El-Latif, Philo, Sandys, etc.

In 1714, the English traveller, Paul Lucas, found the pedestal completely buried in sand, and even the shaft up to a height of 12 feet. But this sand had evidently blown away in part in 1738, when Shaw¹ states, "the Height of it is found to be fifty (French) Foot, three whereof are buried underground." Again, in 1743, Capt. Norden observed: "This Obelisk of Cleopatra is situated

¹ Shaw, *idem*, 412.

almost in the middle, between the New City and the Little Pharillon. Its pedestal, of which a part is buried, is elevated 20 feet above the level of the sea. Between this monument and the Port runs a thick wall, flanked with a great Tower on either side of the Obelisk; but this wall is in such a ruined state, that its top is almost level with the pedestal of the Obelisk. The inner part of the wall is but ten feet from this monument, and its outer part but four to five steps from the sea."¹

In 1787, the pedestal seems to have been visible, according to Savary: "Towards the eastern part of the palace are the two obelisks, vulgarly called Cleopatra's needles, of Thebaian stone, and containing numerous hieroglyphics; one is thrown down, broken, and covered with sand; the other still rests on its pedestal."²

In 1801, it was remarked by Mayer: "The Obelisk near Alexandria, called Cleopatra's needle, is a block of granite, not quite six feet in diameter at it's base, and near seventy feet high originally; but it's pedestal, and part of it's base, are buried in the sand."³

Aguin, in 1843, Cooley represented⁴ the base of the Obelisk free from sand, but its pedestal still buried, standing in a pit from which the sand had been dug out, for examination by the visitor.

On old maps, the position of the two monuments is commonly marked by two little squares, whose sides on Pococke's "Plan of Alexandria" face about N.W.,⁵ but, on most maps, are placed parallel to the shore, which here runs about E.N.E., *i. e.*, they front about N.N.W.

In the more elaborate and faithful drawings of the many represented in plates, in early works of travel, I have made a careful examination of the hieroglyphs, and of the cartouches, whose position and number differ greatly on the different sides of the shaft; also in many photographs, taken at Alexandria at various periods, which show clearly the inscriptions and the well-marked nick, which, as already explained, was probably directed nearly to N.N.W., as the Obelisk stood at An.

[Here the following drawings and photographs were exhibited by lantern projection: View of Alexandria from the sea, in 1755, showing the erect obelisk and remnant of the wall: Views of the Obelisk in 1755, showing the present E.S.E. side, then facing the

¹ Norden, *idem*, I, 5.

² Mayer, *op. cit.*, 29.

⁵ Pococke, *idem*, I, 2.

² Savary, *idem*, I, 36.

⁴ Cooley, *op. cit.*, 155.

N.N.W.: Views of Obelisk in 1801, with truncated apex on pyramidion, in 1830, and in 1842, with the sand dug away from pedestal: Photographs in 1870 and about 1880, showing the "nick" directed landward: Views of the fallen obelisk in 1755, and the present London Obelisk, with fractured edges and pyramidion.]

All these plainly and certainly show that, in the position of the shaft at Alexandria, this nick was directed toward the S.S.W.

In other words, when the Romans re-erected the shaft at Alexandria, they placed it before the new Temple of the Cæsars, fronting the sea and the water-gate, *i. e.*, toward the N.N.W.; and moreover, turned the shaft about half round from its original orientation, so that its two best preserved sides would meet the view of the visitor, on his approach to the Temple from the north. The two burned and mutilated sides were turned to the S.S.E. (toward the Temple) and to the E.N.E. The same position, and probably a similar rotation, were carried out in the re-erection of the companion monolith, now at London.

The view above expressed, however, does not agree with that of Gorrington. In Plate XI of his work, evidently prepared in very careful detail, he gives a plan of the pedestal and steps of the foundation, as they stood at Alexandria, with the angles marked N., S., E., and W., each with an arrow, as if to impress its exactness. On the opposite page (18) he also refers to the "S.E. face of the structure" and the "S.W. face." Nor does he make any reference to the change and rotation in the position of the faces of the shaft above.

10. *Condition of the Obelisks at Alexandria.*

We may now report some of the testimony of travellers in regard to the condition of the surface of these monoliths and their theories to account for the injury observed.

In 1738, Shaw related: "But the Alexandrian Obelisk, lying nearer the Sea, and in a moister Situation, hath suffered very much, especially upon that Side which faceth the Northward; for the Planes of these Pillars, no less than those of the Pyramids, seem to have been designed to regard the four Quarters of the World."¹

In 1740, a Danish gentleman in the squadron of Admiral Hadcock, reported thus² in Florence: "The hieroglyphs on two adja-

¹ Shaw, *idem*, 412.

² Norden, *idem*, I, f.

cent sides (the W. and the N.) are of great beauty; but the others (on the E. and S.) have been much injured by wind and damp; that is why I have represented them exactly as they occur."

In 1743, Capt. Norden observed: "There are only two of the faces which are well preserved; the two others are defaced, and the hieroglyphs can hardly be seen by which they were anciently covered. . . . The injury and effacement on two sides of a stone of such hardness enable us to understand the great difference between the climate of Alexandria and that of all the rest of Egypt; for it has neither been fire nor the hand of violence which has injured these stones. It is clearly evident that it has been only the injury of Time which has eaten away some of the characters and has effaced others, although incised to considerable depth."¹

In the work of Mayer in 1801, it was remarked: "The sides facing the N.W. and S.W. are best preserved, the hieroglyphics on the other two sides being greatly defaced, especially toward the lower part, large scales falling from the stone, notwithstanding its hardness."²

Lenormant, in 1841, concluded: "The obelisk, which has remained erect, has suffered greatly from the saline and corrosive dampness of the sea, principally on the N. and W. faces which front the Mediterranean; that which lies overturned is perhaps still more worn than the other."³

In 1842, Lepsius observed: "The two obelisks, of which the one still standing is called Cleopatra's Needle, are very much destroyed on the sides which are exposed to the weather, and in part have become totally illegible."⁴

It was remarked by Long: "Only two of the faces are in a state of good preservation; the other two, the E. and S. sides, being so much damaged by the moist atmosphere of Alexandria, that one can hardly see the sculptures on them. The S. side has suffered most of all."⁵

In 1864, Clark observed that these obelisks were "sadly out of place amid the poverty and dampness of a sea-town. One of these is fallen, and the other is wasting away in the unfriendly air."⁶

In these quotations several careless references occur in naming the sides, as those of the N.N.W. and W.S.W. (usually called the

¹ Norden, *idem*, I, 7.

³ Lenormant, *idem*, 47.

⁵ Long, *idem*, 302.

² Mayer, *idem*, 29.

⁴ Lepsius, *Letters from Egypt*, 42.

⁶ Clark, *idem*, 31.

N. and W., or the N.W. and S.W.) were the ones in good preservation, and those of the E.N.E. and S.S.E. (usually called the E. and S.) were the ones badly decayed.

As to the fallen (London) obelisk, whose base or pedestal probably still lies a few yards S.W. of the former site of the New York Obelisk, two of its sides, ordinarily designated as fronting N. and W.¹ at Alexandria, exhibit very good hieroglyphs, but its heel and edges are battered.

Cooper also states: "The apex is roughly cut and damaged, having been covered, like most of the obelisks of Thothmes III, with a bronze cap. . . . The base of the monument and its two steps or gradués remain entire; they are of limestone and are nearly seven feet high. . . . Owing to the position in which it fell, the monolith has been much exposed to injury, alike from the friction of the sand and the corrosive action of the salts in the sea-breezes; indeed, the S. side has suffered most of all, the hieroglyphics being in many places wholly illegible; the E. face has also suffered severely; the W. face and that which rests upon the ground have been better preserved."² The following statement in regard to the surface of the under side of this obelisk, in 1801, after five centuries' partial burial in the sand, implies that the influence of this material, even so near the seashore, has been for protection rather than corrosion: "The Needle was likewise turned over, and the hieroglyphics, on the side it had so long lain on, found fresh and entire."³

It will be readily seen, on reviewing these opinions, that there is no agreement as to which were the faces of our Obelisk on which the hieroglyphs were damaged. So unquestionable were the two facts, the mysterious but serious effacement of hieroglyphs on two sides and the great difference of climate in the new home of the Obelisk, that the passing traveller was often unable to accept the evidence of his own eyes. However, it is equally beyond question that it was the present E.S.E. and N.N.E. sides of our Obelisk and the corresponding sides of its London fellow which bore the brunt of attack by the sea-winds at Alexandria for nineteen centuries, and that these are in excellent condition. The injury to the other two sides must then have preceded the Roman transfer of the monoliths from An.

¹ Gorringe, *idem*, 97, 108.

² Cooper, *idem*, 125.

³ *Bombay Courier*, June 9, 1802.

11. *Climate of Alexandria.*

As the unanimous conclusion of the authors just quoted was to attribute the decayed condition of the surface of the obelisks to the damp and saline atmosphere of Alexandria, it is pertinent to consider here some notes on the climate of that city, in comparison with that of Upper Egypt. M. Gratien-Le-Père, Chief-Engineer of the Corps Royal des Ponts et Chaussées, in the French Expedition to Egypt in 1801, states: "The climate of Alexandria is quite healthy; although very warm in summer, this is tempered by the coolness of the nights. The dews of evening, especially in the season of the Etesian winds, are here, as in the entire maritime border of Egypt, of a saline dampness which penetrates all bodies. Winter is very rainy at Alexandria."¹

Viscount Valentia, in 1802, observed: "The climate is by no means unpleasant, as the heat is tempered in summer by the strong gales, which almost constantly blow from the north, and carry with them the thick black clouds, that, after breaking on the mountains of the interior of Africa, return in the floods of the Nile to fertilize the plains of Egypt."²

In Southern Egypt, during the summer (April to October), the temperature varies during the day from 100° to 112° F. in the shade; in Northern Egypt it is cooler. The minimum rarely falls below 40° F. In the French Expedition, the observers noted a minimum of 36½° F., in January, 1799; the average during the night was 46° F. In 1874, a minimum temperature of 23° F. was observed by Rohlf in the Libyan desert. In the Upper Nile valley, showers ordinarily fall only on about 5 or 6 days in the year; heavy rains are rare, occurring about once in 15 or 20 years. It is commonly stated that frost and snow are wholly unknown in Egypt; yet it is recorded that frost has been seen at Cairo,³ and in the Algerian desert, in latitude but a few degrees further north, snow fell in the year 1847.

At Alexandria, "rain is as common in winter as it is in the south of Europe. But during the rest of the year, as little falls as in the upper country; and at 50 or 60 miles from the coast, the winter rains cease, the climate of Cairo being no less dry than that of the Thebaid."⁴

¹ Gratien-Le-Père, *op. cit.*, III, 279.² Valentia, *op. cit.*, 466.³ Foissac, *op. cit.*, II, 263.⁴ Rawlinson, *Hist. Anc. Egypt*, I, 43.

"The general height of the thermometer in the depth of winter in Lower Egypt, in the afternoon and in the shade, is from 50° to 60° ; in the hottest season, it is from 90° to 100° , and about 10° higher in the southern parts of Upper Egypt."

"On the coast of the Mediterranean rain is frequent, but, in other parts of Egypt, very unusual. At Cairo, there is generally one heavy storm in the winter, and a shower or two besides. . . . At Thebes, a storm occurs but once in about four years, and light rain almost as rarely. The wind most frequently blows from the N.W., N., or N.E., but particularly from the first direction. . . . The southerly winds are often very violent, and, in the spring and summer, especially in April and May, hot sand-winds sometimes blow from the south, greatly raising the temperature."

A recent traveller³ states concerning the rainfall between February 1 and April 15, 1889: "My first experience in Egypt was calculated to give the impression that it is a rainy country, for I saw two showers in three days. In passing through the Suez Canal (January 31st), a heavy shower, lasting half an hour, drove the passengers to shelter, and a brilliant rainbow delighted beholders. Two days later, rain again fell at night in Cairo, making the dirty streets more nasty still. Of course this experience was exceptional, as rain is a rarity in Cairo. Authorities give the rainfall at Alexandria as about 8 inches per annum, and at Cairo about 1.2 inches; while in Upper Egypt the precipitation of moisture is far less; there are adults living there who say they have never seen rain.

I noticed, on the other hand, unmistakable signs of recent rains, such as dried mud-puddles, raindrop-prints, etc., at several points near Cairo, east of Thebes (Wadi Bab-el-Molook), and in the peninsula of Sinai, and I was impressed with the belief that more rain falls in Egypt than is usually supposed. A local shower, passing over a sandy gravelly region, makes but little impress on it; and there is no corps of trained observers, outside of Cairo and Alexandria, to record the phenomenon. . . . On February 16th I visited a wild valley west of Thebes, known as Wadi Bab-el-Molook. . . . The valley throughout shows that water has at some time been energetically at work; the floor resembles a dried-up mountain

¹ Lane, *Modern Egyptians*, Intro.

² R. S. Poole, *Encyc. Brit.*, VII, 703.

³ Bolton, *loc. cit.*, 113, 117, 118.

130 *Study of the New York Obelisk as a Decayed Boulder.*

torrent; banks of gravel, sand, and boulders rise several feet above the bridle-path on each side; and, at the lowest part, small channels wind about the large rocks. The hillsides are furrowed by ravines excavated by water. Here and there, in low places, usually at the foot of a large boulder, are unmistakable signs of recently formed mud. The scales and mud-cracks were quite fresh, and seemed to indicate that water had accumulated in pools not more than two or three weeks before. On my return to Luxor, I was informed that rain had fallen about three weeks before (February 16th)."

In a discussion of the heavy dews in Egypt, Volney states: "These dews as well as the rains are more copious towards the sea, and less considerable in proportion to their distance from it; but differ from them by being more abundant in summer than in winter. At Alexandria, after sunset in the month of April, clothes exposed to the air and the terraces are soaked with them, as if it had rained."¹

All these facts, therefore, bear out the idea of the moist character of the climate at Alexandria.

12. *Removal of the Obelisk from Alexandria.*

The details of the great enterprise of the lowering of the huge monolith at Alexandria, in 1879, and of its conveyance to New York, have been fully set forth by the engineer in charge, the late Commander H. H. Gorringe. It will be sufficient here to refer only to certain points which might be considered to have some bearing on possible strain or injury to the monument in transit. On October 29, 1879, the work of excavation began, and the bottom of the lowest step of the foundation was found to lie nearly at mean sea-level. This indicated a probable subsidence of the coast of about 17 feet in 1900 years, attended with a decided and increasing inclination of the top of the shaft toward the sea, which must have soon resulted in its fall.

The sides of the lower part of the shaft (as illustrated by a photograph of the bottom of the W.S.W. side, taken at the time of the removal of the London Obelisk) showed the same effaced hieroglyphs, rounded corners, and peculiar smoothed surface as now seen.

Gorringe states that in turning the Obelisk, its bottom bound against the top of one of the crabs, and "removing the crabs was

¹ Volney, *idem*, I, 56.

very difficult, by the lead which had been poured into the mortices in the pedestal while molten."¹ From this it may be inferred that he found the crabs attached only to the pedestal.

In December, 1879, while the shaft, carefully sheathed in heavy plank, was being turned on enormous trunnions, supported on steel towers, a little accident occurred, which he has thus described:² "Immediately following a creak louder than any previous one, the motion was suddenly arrested; then there was a sharp snap—one of the tackles had parted. Instantly the order was given to slack the other tackle rapidly, using it merely to retard the motion and not to arrest it; but the man attending the fall had lost his wits, and, instead of slackening, he held it fast and it very soon broke. The obelisk was at that moment about half over. It moved slowly at first, and then more and more rapidly, until it struck the stack of timbers, rebounded twice, and came to rest in the position" shown in an illustration. "There was intense excitement; many of the Arabs and Greeks about the grounds had fled precipitously, when the obelisk began to move rapidly; and when it rested on the stack of timber uninjured, there arose a prolonged cheer. . . . The two upper tiers of plank were crushed; aside from this, no loss or injury to any person or anything resulted from the successful accomplishment of the first essential feature of the work of removal."

Later, during the launching of the caisson which enclosed the Obelisk, its safety was endangered in the surf by a rising storm, and Gorringe allowed the caisson to fill, in order to diminish its buoyancy and prevent it from thumping heavily on its ways. The shaft thus remained immersed in salt water for several days.

After the monolith had reached the floating dock, and had been at last safely introduced into the hull of the Steamer "Dessoug," Gorringe states, "to obviate all risk of breaking the Obelisk by the working of the ship, it was placed on a bed of Adriatic white pine, very spongy and soft, and ten feet of the extremities left without support. To prevent it from moving laterally, a system of horizontal, diagonal, and vertical shores were fitted into the hieroglyphs, and driven against stringer-pieces of the steamer's hull."³ During the voyage of 37 days, some stormy weather was encountered, both in the Mediterranean and the Atlantic. In spite of all

¹ Gorringe, *idem*, 14.

² Gorringe, *idem*, 15.

³ Gorringe, *idem*, 27.

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care, it looks probable that certain projecting hieroglyphs may have been subjected to some undesirable degree of strain.

IV. NEW YORK.

On its arrival at New York, the pedestal was directly landed upon New York Island, but the shaft was first landed on Staten Island, September, 1880, then towed to the foot of West 96th Street, again landed, and thence dragged around Central Park and re erected on "Graywacke Knoll," January 22, 1881.

13. *Position of the Obelisk at New York.*

The foundation of the monolith was laid upon the outcrop of the vein of endogenous granite, already mentioned. Gorringe states: "The earth having been removed from the top of the Knoll, the surface of the granite was levelled and the cavities filled with cement. A thin layer of this was then laid over the granite, and the foundation was replaced exactly as it had stood in Alexandria, each piece in the same relative position to the others and to the points of the compass."¹

In Plate XI of the same work, as already explained, he designates these points of the compass, for the angles, as N., E., S., and W. Elsewhere, he refers to the four sides of the shaft, as facing N., S., E., and W., taking those terms from Chabas and Brugsch, who used them, it may be presumed, loosely, in a general way.

On examination with a compass, however, I was surprised to find that the sides do not now face N. 45° E. (N E.), S. 45° E. (S.E.), etc., but respectively N. 27° E. (nearly N.N.E.), S. 63° E. (nearly E.S.E.), etc.

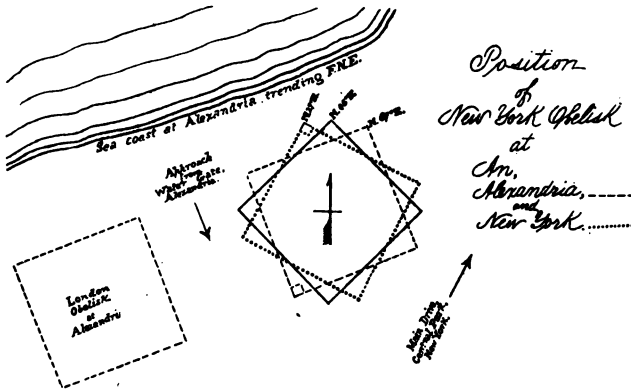
Gorringe's statement refers only to the foundation of the Obelisk, but a reader would naturally infer that the shaft was also replaced here "exactly as it had stood in Alexandria." However, I must call your attention again to the tell-tale nick, now directed to about N. 18° W., while at Alexandria it pointed to about S. 23° W. It thus appears that, on its re-erection in New York, not only was the whole foundation changed in position from that which it occupied on its Alexandrian site, but that also the shaft was twisted nearly half round to the right: so that both shaft and pedestal now stand once

¹ Gorringe, *idem*, 32.

more in the original position at An. The incorrect statement of Gorringe as to the Alexandrian position of the foundation, and his silence on the readjustment of the shaft, remain without explanation. But in his fortunate accuracy in that readjustment, I can only conjecture that he may possibly have been guided by a knowledge of the true orientation of a surviving companion of our Obelisk, the one still on the site of An: if it shall be found, by more close observation than that recorded by Niebuhr, that this really faces to the present direction of the W.N.W side of the New York Obelisk, W. 27° N.

I have plotted, on the accompanying illustration (Fig. 1), the

Fig. 1.



positions which our roving monolith has successively occupied on its three sites, always accompanied, until now, by its London fellow on its left: viz., its positions at An and at New York, by the square with dotted line and nick; its position at Alexandria, by the square with broken line and nick; and, for comparison, its position at Alexandria, according to Gorringe, by the square with continuous line. The interspaces, between the two obelisks and between them and the shore, are contracted in the illustration, for convenience.

It is much to be regretted that a satisfactory explanation of the statement in question has probably been lost by the death of the eminent engineer, in July, 1881, only five months after the completion of his great enterprise, in the successful transfer and re-erection of the Obelisk.

14. *The sudden decay of the surface of the Obelisk.*

In regard to the condition of the surface of the New York Obelisk, immediately after its arrival, there is the following testimony by an experienced geologist,¹ in February, 1883: "The first thing that strikes one is the freshness and soundness of the rock. No 'maladie du granit' is observable, and this fact will answer the first and natural question as to why this rock was so much preferred by the Egyptians for monumental purposes."

On thin sections from the same specimen, Prof. Alfred Stelzner² also states, though with some confusion of the products of metamorphism with those of decay: "The microcline . . . is very fresh and free from interpositions. . . . Secondary formations are almost entirely wanting in the sections before me; in only two places appear viridite and yellowish green translucent needles of pistazite. The rock of the 'Needle' can therefore be regarded as unusually fresh and 'healthy,' in spite of the honorable age which it possesses."

The specimen, on which these examinations were made, probably formed part of the material cut off, in 1880, from portions of the base of the shaft, by direction of Commander Gorringe, in order to increase its bearing surface on the pedestal and stability, and to facilitate the attachment of the new bronze crabs. About four barrels full of pieces were at that time removed, and are now preserved in the American Museum of Natural History.

Within about a couple of years afterward, the incipient decay of the surface seems to have been first indicated by small pieces of granite, lying around the base, evidently fallen from above. This sudden and strange disintegration was met at first with great incredulity, since it was plainly not due to old age; the monolith had yet seven centuries to catch up with the age of its sturdy old companion, still on the site of An.

In October, 1883, this change was brought to the attention of Dr. F. A. P. Barnard,³ who found "the surface of the stone step, immediately below the plinth, sparsely strewn with minute fragments of the rock," carefully swept them off, collected and weighed them, to the amount of 24.56 grams (about $\frac{7}{8}$ of an ounce). From this he calculated the waste per square meter of the surface of the

¹ Frazer, loc. cit., 364; Gorringe, op. cit., 161.

² Frazer, loc. cit., 372-374; Gorringe, op. cit., 166-167.

³ Evening Post, New York, Oct. 30, 1883.

monument per annum to be 0.457 gram, or, from the entire wasting surface, 10.88 grams; and estimated that if "the mass of fragments actually collected was not more than a tenth part of what had fallen during the time the Obelisk has been in our Park, it would still require 6000 years to reduce its volume to the depth of one centimeter on each side."

During the next year, 1884, the progress of the decay became still more manifest by the flaking away and fall of fragments, sometimes of considerable size. Commander Gorringe could hardly believe that they came from the monolith, and expressed the hope that some day it would be polished.

In the autumn of the same year, the attention of the Park Commissioners was directed to this serious decay, and they finally decided to make use of a waterproofing process, founded on the application of melted paraffin to the artificially warmed surface of the stone. This was begun on September 25, 1885, after the Obelisk had stood, entirely unprotected from the elements, for 4 years and 8 months after its re-erection.

In the notes of another observer,¹ made at this time, on the weathered exterior of the Obelisk, it is stated: "Most of the fractures of the flakes seemed of recent origin, although under most of them was found a green vegetable growth of unicellular plants. However, beneath some pieces, the accumulated black dirt showed the fractures to be of more remote origin. . . . Placing a fragment of the rock under the microscope, portions of it show decided disintegration, parts of the hornblende being broken down and dissolved, while some of the white feldspar is broken into such minute fragments that they exhibit the Brownian movement when placed in water. In the minute crevices can be seen the green cells of vegetable growth, and, on either side of the crevice, may sometimes be seen, with the microscope, the rosy hue indicating internal strains in the very minute fragments, a slight increase of which would complete the fracture; and it is possible that the growing cells may furnish the necessary strain." All these vegetable cells were green, some rod-shaped, others round like those of *Protococcus pluvialis*.

On the S.S.W. side of the shaft, where the decay was most pronounced, some of the adhering flakes of rock were found to be parted above from the shaft as much as one-quarter of an inch, a crevice of that width being sometimes found filled with moss and black earth.

¹ Dudley, loc. cit., 67.

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In regard to the *Protococcus*, I may reply that its superficial adherence to stone-work is of common occurrence in this country as abroad; and, though often considered unsightly, its presence has never been connected with the decay of stone. The naturalist familiar with its delicate isolated cells will need proof of their ability to produce internal strains in the crevices where they find refuge.

In the preliminary cleaning of the surface, before the waterproofing process was begun, it was discovered that very many spots were in a deplorably decayed condition, especially on the S.S.W. and W.N.W. sides of the shaft. Some large pieces were so loosely attached that they would scarcely bear the hand upon them without falling away. One large slab on the E.S.E. face, with the hieroglyphic symbol of the sun in its centre, actually dropped off in the grasp of a person who laid his hand upon it, to steady himself, while walking by upon the scaffold. This piece was left below, stolen over night and never recovered. No attempt was made to harden or recement this crumbling surface, but it was decided to remove only the looser flakes, most likely to fall, and then apply the preservative. In the course of this removal, one fragment, showing hieroglyphs, was separated from the upper part of the W.S.W. corner of the shaft, which measured $18\frac{3}{4}$ inches in length, $3\frac{1}{2}$ inches in width, and $\frac{3}{4}$ of an inch in thickness; but most of the scales were small pieces, often cracked and ready to crumble. In all, about $2\frac{1}{2}$ barrels of pieces were removed, found by the Park Superintendent to weigh 780 pounds; of these, three-quarters or more came from the S.S.W. and W.N.W. faces of the shaft. In regard to the great error of judgment shown in the above action, I have elsewhere¹ expressed the universal public opinion.

15. *The waterproofing treatment of the Obelisk.*

The entire surface of the Obelisk was then warmed,² in successive portions, by the application of a square pan of burning charcoal, with front of wire grating, for two or three minutes, at a distance of about one inch. The projections and hollows on the surface were warmed by means of a benzine blast-lamp. Immediately after the warming, the compound of paraffin, containing creasote

¹ Misfortunes of an Obelisk, loc. cit., 132.

² Robert M. Caffall, *Scientific American*, XXI (1886), Supplement, p. 8391; and in paper on "The Preservation of Building Materials by the Application of Paraffin, as recently used upon the Obelisk," *Trans. N. Y. Acad. Sci.*, V (1885), 56-66.

dissolved in turpentine, was applied at its melting-point (146° F.) by means of a brush, and the stone then warmed again until the excess of paraffin was absorbed beneath the surface. The surface treated, on shaft and plinth, amounted to about 220 square yards, and absorbed $67\frac{3}{4}$ pounds of paraffin, to an estimated depth of half an inch or a little more. An equal surface of brownstone would have taken from 40 to 50 pounds, and of brick from 70 to 110 pounds; so that the great porosity of the weathered coating of the Obelisk is clearly shown. Little difference in the action of different parts of the surface toward the paraffin was noticed, except that the black masses of hornblende were particularly absorbent.

A few months afterwards, Dr. T. Egleston presented views founded on an inspection of the Obelisk and of pieces derived from its decayed surface. In these he observed, under the microscope, deep irregular cavities, near the grains of hornblende, empty or partly occupied by that mineral, and crevices containing the green *Protococcus* referred to by Mr. Dudley. He concluded that disintegration had been long going on and was still in progress in the interior of the stone, not of chemical but purely physical cause, mainly the repeated expansion and contraction produced by the rapid and extreme changes of temperature in this climate. In regard to the waterproofing process applied to the Obelisk, he states:¹ "The method of applying the present protecting coating seems to have been a fatal mistake. Nothing of any account has been dissolved out of the stone; there is therefore nothing to be replaced. If there had been, paraffin in solution would have been one of the best materials to fill them. Granite is not porous; there were, therefore, no cavities to be filled. The stone being full of cracks from natural causes, the heat which was used to cause the paraffin to sink into the body of the stone, when applied to the outside, would cause an expansion, which would not be responded to by the interior of the granite, and the cracks already there would increase in size, and pieces would chip off as they did, and new cracks would be formed in the stone, already weakened by long exposure. . . . Even if the surface was entirely waterproofed, the cold of winter and the heat of summer would act below the surface both of the coating and of the stone, causing the coating to break or fissures through it to occur, so as to let in the moisture, and then both causes would operate together as before."

¹ Egleston, loc. cit., 81.

The crumbling decayed stone from the surface of the Obelisk was very unsatisfactory material from which to determine the condition of the stone beneath, and misled the three observers to quite opposite conclusions concerning the decay: Dr. Barnard, to disbelieve in its extent and progress: Mr. Dudley, to connect it with strains produced by the cells of *Protococcus*: and Dr. Egleston, to attribute it mainly to temperature-variations in our own climate. However, the slight plant-growth was doubtless merely accessory. It will be shown beyond that granite is really porous, and its cavities occupied by a substance, moisture, which must be displaced for the proper introduction of any preservative: that this is too powerful a stone to be injured by gentle warming: and that oscillations of temperature had nothing to do with the sudden disintegration of the surface of the Obelisk in 1882-1885.

In regard to this mooted and important question—the effect of moderate elevations of temperature on granite, I have next to present, first, the results of a series of experiments on the application of artificial heat to various building-stones and to the granite of Syene: secondly, some comparative statistics, reduced and tabulated, from meteorological reports on thermometric oscillations in Egypt and New York.

16. *Experiments on granite with artificial heat.*

• In view of objections taken against the application of heat to granite, as used in the process of waterproofing the Obelisk in 1885, I have made sundry experiments to determine the degree of heat then used and the exact periods of time during which it was applied, repeating exactly the same process with the same apparatus and workmen.

On testing with a thermometer the melted paraffin compound in the "U. S. pot" used in the process, it was found, if the paraffin was allowed to become entirely fluid, that its temperature rose to 70° to 75° C. But when, as always occurred during work, a cake of solid paraffin was kept floating in the liquid, the temperature varied from 59° to 67° C., closely approximating 63° C. (146° F.).

During the autumn of 1889, the ordinary waterproofing of stone buildings near New York City was carefully studied. On a cold day, at Orange, N. J., I carefully watched the application of the process to surfaces of Nova Scotia sandstone, in a state of incipient decay, to ascertain the periods during which the stone surfaces

were heated, the melted paraffin applied, and the stone reheated. A condensed statement of the observations is here presented.

Experiment.	Surface treated.	No. of observations.	Periods (in seconds).			
			First heating.	Paraffin- ing.	Second heating.	Total.
1	Stone chimney	3	29	21	18	68
2	Decayed brick wall . . .	5	78	17	34	
3	Stone jambs and mullions of a window	3	21	17	17	
4	The same	5				55
5	The same	4				45
6	Brick wall	7	28	21		65

The temperature of the air was 6° C. (43° F.), which happens to be about that which prevailed during the waterproofing treatment of the Obelisk in 1885. In the treatment of Nos. 1, 2, and 6, the charcoal-stove was applied, at a distance of 1 to 3 inches from the surface; in that of Nos. 3, 4, and 5, the benzine blast-lamp, over a surface of about 40 square inches. During the heating, a few sandy particles fell from the decayed and softened surface. From the totals, it appears that the entire treatment of a stone-surface, as observed with several workmen, was completed, on the average, in 58 seconds.

These results served as a basis for arrangement of a series of experiments, carried on some weeks later, with the same process and apparatus, in the north court of the old building of Columbia College, at 50th Street, New York City. The treatment was applied in the usual way to various surfaces of old brickwork, covered with hard and dry cement-stucco. In each experiment a thermometer was so inserted, beneath the stucco, that its bulb lay at the depth of 3 mm. ($\frac{1}{8}$ inch) below the heated surface; the object was to determine the rise in temperature of the superficial layer of cement. Temperature of the air, 15° 5 C.

Ex- peri- ment.	Original tem- perature of cement.	Source of heat.	First heating.		Paraffining.		Reheating.		Total period.
			Period (in seconds).	Resulting temperature.	Period.	Temp.	Period.	Temp.	
7	12°.0	Blast-lamp.	85		35		25		145
8	13°.5	Blast-lamp.	55	24° to 34° C.	35	39°.7	25	40°	115
9		Stove.	135		35		35		205
10	17°.5	Stove.	50	34°	30		20	42°.5	100

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It was apparent that the temperatures recorded by the thermometer only indicated the inferior conduction of heat by the layer of cement. Other tests satisfied me that, with a layer of compact stone like granite, the final temperature in each experiment would have risen at least 20° higher than those above observed.

In order to determine the surface-temperature attained during the heating, the treatment was then applied to a series of dressed cubes of various building-stones, one inch square, imbedded in square cavities, one inch deep, cut in the surface of the cement, so that the outer faces of the cubes in each group lay in the same plane with the surface of the cement. At the end of the second heating, the bulb of a thermometer was instantly applied to the surface of the cubes and covered with felt to prevent radiation.

Ex-periment.	Source of heat.	First heating: Period.	Paraf-fining: period.	Second heating: period.	Total period (in seconds).	Final tempera-ture.	Kind of stone.
11	Stove.	85	35	15	135	42°.1 C.	Dark sandstones.
12	Stove.	95	27	30	152	64°.7	Granites and marbles.
13	Stove.	112	38	0	150	51°.6	Limestones.
14	Stove.	94	22	24	140	62°.7	Light-colored sandstones.
15	Blast-lamp.	49	16	19	84	67°.3	Granites.
16	Blast-lamp.	73	31	13	117	70°.1	Granites.
17	Blast-lamp.	68	34	16	118	69°.8	Granites.

To the final temperatures found, I saw reason to attach no importance, as they were evidently much diminished by the rapid radiation, before adjustment of thermometer and felt. So both stove and blast-lamp were then each applied directly to the bulb of a thermometer, at a distance of one inch, shifting the source of heat about in the usual way. It was thus found, on repeated trials, that a temperature approaching 80° to 85° C. (185° F.) was momentarily attained.

From these results we may gather the following as probable conclusions, in regard to the conditions of temperature during the waterproofing treatment of the Obelisk in 1885:—

(a). The period of heating by stove or blast-lamp and by the melted paraffin was probably a little longer than in the regular process, *i. e.*, 2 to 3 minutes (instead of 1).

(b). The temperature of the melted paraffin, as applied, did not exceed 67° C. (153° F.), and in general was about 63° C. (146° F.).

(c). The surface of the stone was rarely subjected to a higher temperature than 85° C. (185° F.), and probably never, when the stove was used.

(d). Only a very thin outer layer of the granite of the Obelisk was heated beyond the melting-point of paraffin, $60-63^{\circ}$ C. (146° F.), probably between 6 and 12 mm. ($\frac{1}{4}$ to $\frac{1}{2}$ inch) in thickness.

Some effort was also made, in these experiments, to ascertain whether the surface of the granite of the Obelisk could have suffered damage from the temperatures (60° to 85° C.) and treatment indicated. Among the samples of granite imbedded in the surface of the cement were pieces of the original fresh stone of the Obelisk, each with a polished face set in flush with the general surface. These faces had been previously studied under pocket-lens, and then under a microscope, with magnifying power of 30 diameters. On re-examination, after the conclusion of the treatment, no effect whatever was detected on the surface subjected to the stove; on the other, treated by the blast-lamp, two or three very minute checks or crevices, perhaps a millimeter in depth, seemed to have developed.

On the same question, some information may be derived from the experience of lithologists, in the mode of mounting thin rock-sections for microscopic examination. After having been ground down to transparent pellicles of extreme thinness and delicacy, these are commonly immersed, on a slide, in a drop of partially inspissated and hardened Canada balsam.

In the first experiments on this subject, a drop of balsam on a glass slide was heated upon a mounting-table, usually from 3 to 5 minutes, for the partial evaporation of the excess of turpentine, its natural solvent. At this point, in place of a rock-section, the bulb of a delicate thermometer was inserted into the drop, and a temperature of 107° C. (220° F.) was noted.

Again, a quantity of the balsam, about 200 c. c., was slowly evaporated in a shallow tin-pan, over a low flame. The temperature, 50° C. during the first half hour, then rose to $108-110^{\circ}$ C., and so remained for 3 hours; after 7 hours, when the medium had attained the proper viscosity, the temperature fell to 80° , and, while cooling and still viscid, to 60° .

Since, therefore, the scrupulous needs of the lithologist, in the investigation of intricate structures of rocks and minerals, are not endangered by subjecting a thin rock-section to a temperature of even 107° C. for a minute or more: there seems to be no reason to

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presume that any injury could have been done to the surface of the Obelisk, in the waterproofing process, by warming at a temperature which rarely approached 85° C., during a period not exceeding 2 or 3 minutes.

17. *Effects of the sun's heat on granite.*

In regard to the action upon granite of high natural temperatures, it should be noted that those of rock surfaces, exposed to the sun during the heats of summer, often rise to 150° F. (66° C.) and over, especially if the rock is dark-colored; and that of the sands of African deserts sometimes reaches 200° F.

An interesting application of this natural warming of surfaces of stone occurred during the hottest period of August, this last summer (1892), at Sandy Hook, N. J. The casemates of the fortifications are constructed of a dark concrete, in large part composed of fragments of "bluestone" (flagstone from the base of the Catskill Mountains). On account of the porosity of the concrete and its permeability by rain-water, these constructions had been undergoing for some months the same waterproofing treatment with paraffin as that applied to our Obelisk in 1885. On certain hot afternoons, it was found that the surfaces of those bomb-proofs which lay exposed to the sun had already become heated to such a degree that artificial heating could be dispensed with and the melted paraffin directly applied.

It is a question of some interest, in reference to the durability of building-stones used in New York City, to determine how often the direct heat of the sun reaches its maximum in this climate. By a collation of the observations of Mr. Daniel Draper,¹ the Director of the Meteorological Observatory in Central Park, the following table has been prepared, presenting for ten years the maxima in the sun of 140° F. or over and of 146° F. or over. The latter temperature (63° C.) is that of the melting-point of the particular paraffin referred to above.

¹ Abstract of Registers, 1880 to 1889.

YEAR.	NUMBER OF DAYS ON WHICH MAXIMA IN SUN REACHED OR EXCEEDED:													
	140° F.							146° F.						
	May.	June.	July.	Aug.	Sept.	Oct.	Total.	May.	June.	July.	Aug.	Sept.	Total.	
1880	3	6	4	7	5		25	1			3	4	8	
1881		2	6	15	9	1	33			5	2	5	12	
1882			2	1	1		4						0	
1883			1	1			2			1			1	
1884		2		3	5	1	11				1	2	3	
1885			11	5	1		17			3	2		5	
1886			6	1	2		9			2		1	3	
1887			2				2						0	
1888							0						0	
1889							0						0	
Total number of days for ten years							103	32						

The extreme maxima reached were 151° F., on September 6, 1880, and 154° F., on September 7, 1881. The hours at which the temperature in the sun reached its maximum are recorded for each day in 1885, 1886, and 1887; from these we may conclude that the maximum continues on an average for about $1\frac{1}{2}$ hours, or perhaps somewhat less. If we assumed that the light colored surface of the granite of the Obelisk reached on these days the same temperature as that indicated by the bulb of the maximum thermometer in the sun, which is not probable, we might infer that the surface of the monolith is occasionally heated to the temperature of 146° to 150° F. for short periods, which amount, on an average, to less than five hours during the whole year.

There is then no foundation for the fear, expressed by some persons, that the paraffin, at that melting-point, may flow or has already flown down from the surface to the base of the monument, under the attack of our summer sun. It is more probable, so far as the heat of the sun may ever cause the surface of the paraffin to melt, that this will recement and solidify, during each summer, the superficial minute cracks produced in the paraffin through contraction by the cold of the preceding winter.

As to the intense heat of the Egyptian sun, there is abundant evidence. Burckhart observed the temperature of the air at Esné at 139° F., and Coutelle, that at Cairo at 127° F., and at Philæ, 129° F.¹ Coutelle records a constant temperature at Philæ, from

¹ Foissac, *idem*, II, 272.

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12 to 3 P. M., at 107°.5 to 109°.5 F., on the north and in the shade; in the sun, in open air, up to 113° F.; in the sand, 158° F.¹ Nouet found, opposite the ruins of Thebes, that a thermometer in the sand, at noon, rose to 153°.5 F.; in the shade, 100°, with light wind from N.W.² Also at Philæ, he observed thermometer in the sand at 153°.5 F., and in the shade, 109°. During the removal of the western Luxor Obelisk to Paris, in July, 1836, the engineer in charge, M. A. Lebas, states that the sands burned his feet, the temperature of the air, on one day, remaining for four hours at 66° C. (151° F.): a sun which strongly recalled, as he feelingly remarks, "the energetic and fitting expression of Moses in regard to Egypt 'this furnace of fire.'"³

Dr. Donald Dalrymple,⁴ in 1861, called attention to the considerable diurnal variations of temperature in the climate of Egypt. His series of observations of the temperature of the air, on a Nile boat, during the winter of 1859-1860, showed the following average ranges:—

December, 1859	36° F.	February	50° F.
January, 1860	44° F.	March	30° F.

He also states that "the minimum never registered within 6 degrees of freezing-point out of doors."

More definite on this point are the meteorological observations of Dr. J. D. Hutcheson,⁵ at Thebes, during five months of the coolest season, from November, 1881, to March, 1882, inclusive. During each of these months, the daily maxima in the sun, when reduced from his tables, are found to vary as follows:—

November, 1881	139°-171° F. (59°-73° C.).
December	136°-145° F. (58°-63° C.).
January, 1882	125°-139° F. (52°-59° C.).
February	119°-143° F. (48°-62° C.).
March	134°-155° F. (57°-68° C.).

These figures show that the maximum heat of the sun must be in Egypt far more intense, continuous, and severe upon stone than in the climate of New York. This surprising conclusion is exactly contrary to the prevailing opinion, frequently expressed, concerning the trying climate of New York, with its supposed extraordinary and sudden ranges in temperature. To these has been mainly attributed⁶ the mysterious and sudden destruction which began to affect the surface of our Obelisk, soon after its re-erection in New

¹ Contelle, loc. cit., 334.

² Nouet, loc. cit., 341.

³ Lebas, idem, 60.

⁴ Dalrymple, op. cit., 7, 11, 25.

⁵ Stuart, Fun. Tent of Eg. Queen, 146.

⁶ Egleston, loc. cit.

York (January 22, 1831). As it fortunately happened that the period covered by Hutcheson's observations began in the autumn of that year, it would be interesting to compare the similar observations made by Draper at the same time in this city. As conclusions from averages are also often deceptive, it appears desirable to present the daily observations at both localities. In the following table, I have therefore reduced the daily ranges in temperature during those five months, at each place, in Fahrenheit degrees, between the maximum in the sun and the minimum in the shade.

*Daily Ranges in Temperature (F.) between Maximum in Sun
and Minimum in Shade.*

	NEW YORK.					THEBES.				
	1881.		1882.			1881.		1882.		
	Nov.	Dec.	Jan.	Feb.	Mar.	Nov.	Dec.	Jan.	Feb.	Mar.
1	9	26	48	63	13	103	89	89	82	94
2	13	68	65	64	68	83	85	94	84	92
3	24	41	61	73	71	93	86	88	79	90
4	65	12	65	0	66	83	88	87	90	92
5	68	65	63	75	65	80	90	88	92	93
6	66	42	10	68	26	76	88	83	88	98
7	14	17	8	65	71	77	87	77	89	96
8	18	64	6	68	78	74	83	82	90	94
9	26	63	52	0	0	77	92	85	89	89
10	67	74	59	58	68	79	88	83	89	89
11	72	73	54	68	66	77	88	74	89	92
12	20	45	57	68	43	77	86	80	90	89
13	73	54	3	15	71	83	89	81	86	95
14	66	29	58	63	73	81	94	79	93	90
15	68	34	54	64	63	84	91	87	96	86
16	68	74	52	10	59	87	86	88	76	73
17	73	63	39	78	72	87	87	86	86	89
18	30	66	20	68	70	86	92	87	93	92
19	17	51	70	0	75	88	94	84	94	92
20	65	27	19	75	55	85	85	84	89	85
21	49	40	8	0	0	86	86	83	88	91
22	64	10	80	64	60	85	87	80	70	93
23	20	75	72	71	70	84	89	83	63	85
24	55	58	61	67	55	84	90	89	72	84
25	69	57	44	79	69	82	92	83	86	89
26	68	41	18	62	65	82	92	87	87	87
27	68	8	62	74	0	81	88	86	86	83
28	69	0	4	60	69	82	85	83	91	90
29	67	0	66		69	85	90	87		87
30	76	54	62		63	87	88	85		82
31		51	7		66		88	87		
Averages	51	44	44	54	57	83	88	85	86	87

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The similar averages, at New York, for the remaining months of 1882, were as follows:—

April 49	July 60	October . . . 30
May 41	August . . . 59	November . . 50
June 61	September . . 38	December . . 50

These figures show that while the changes in the range of temperature at New York are frequent and sudden, and correspondingly trying from the physiological point of view, the actual daily ranges of temperature at Thebes are 60 per cent. greater than those at New York, constant, and proportionately severe in the amount of repeated expansions and contractions of the surface of stone caused by such daily oscillations. The ranges at Thebes do not lose in importance from the fact that they occur somewhat further up the scale than at New York, since the question of frost is a distinct subject for consideration.

A natural conviction as to the severity of our climate, with its intense heats of summer, bitter cold periods during midwinter, and frequent and sudden alternations of rains, snow, and sunshine, thawing and freezing, during spring and autumn, has influenced the popular judgment on the true causes of stone-decay.

The common, and, as I think I have shown, mistaken view, thereon upheld, may have been partly founded on inexact appreciation of the intervals between conspicuous extremes of temperature at New York. Thus, in January, 1882, the observed temperatures varied at one time from 97° F. in the sun to —6° F. in the shade, but with an interval of six days between these extremes, and no greater range than 58° on any one of those days. At Thebes, in the same month, the variation of 94° occurred on a single day (the 2d), viz., from 45° to 139° F.

But the actual ranges of temperature to which the surface of a solid body must have been subjected at Thebes, between the extreme heat of the burning sun by day and the cold produced by radiation toward the cloudless sky of Egypt by night, may be probably better estimated with reference to the minima recorded at night by a thermometer on the grass. From Hutcheson's tables for these minima and for the maxima in the sun, I have deduced the following variations of the daily ranges of temperature during each of the same five months.

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November, 1881	90°-111° F. (50°-62° C.).
December	94°-109° F. (52°-61° C.).
January, 1882	86°-106° F. (48°-59° C.).
February	. . . . .	72°-110° F. (39°-61° C.).
March	. . . . .	76°-117° F. (42°-65° C.).

It therefore appears that, even during the coolest season at Thebes, the surface of solid bodies must be subjected to daily variations of temperature approaching 72° to 117° F., *i. e.*, about 100° F. every day. Also, from the table of maxima already given, that a surface of stone is daily heated for a time, during eight or nine months of the year, to a temperature at or above that of melting paraffin (146° F.). So far then as concerns mere oscillations in temperature, the climate of Egypt must be far more trying to the surface of stone than that of New York; the Obelisk, since its transfer to New York, has been in much less need of protection from injury by mere variations of heat and cold; and its sudden decay immediately after its arrival here was certainly not due to this agency.

This subject has been here considered and discussed in some detail, on account of the divergence of my conclusion from the common view, and of its practical bearing on the true cause of injury to building-stones, as well as to the Obelisk, to be feared from our climate, and on the proper method for their protection.

We have also invaluable evidence, already presented, as to the slow action of even the burning sun of Egypt, as well as of its extreme diurnal changes of temperature, upon the surface of granite, in the condition of all the obelisks and of their sides which faced the mid-day and afternoon sun (paragraph 8, (4), b), during recorded periods of enormous length.

18. *Waterproofing treatment of other Egyptian obelisks.*

We may here pertinently refer to processes adopted abroad for the protection from the weather of other Egyptian obelisks of the same granite, and to the scanty testimony concerning their results.

(1). *The London Obelisk*.—This monolith, once the fallen companion of our own at Alexandria, reached the Thames, January 20, 1878, and was re-erected on September 12 of the same year. As to its condition on arrival, Prof. Bartlett, of London, has stated in a letter: "Soon after it arrived in the Thames, I was requested to examine its then condition, and to advise a professional friend at

the Metropolitan Board of Works. My report was that the granite had become largely decomposed at the surface, and was more or less undermined by the action of the weather during many centuries; that one face was far more eroded by the attrition of the sand, and perhaps by the chemical action of the Nile water, than were the other three sides. In short, that the granite was precisely in that absorbent state that it would imbibe dampness from our atmosphere, and become liable to exfoliate and throw off scale after scale, under the influence of frost, until but little of the inscriptions would be likely to remain, after one or two of our English winters." As to the preservative soon after applied, Mr. John Dixon, the engineer who conveyed the monolith to London, writes, in a recent letter (May, 1891) to the London Times:—

"My attention has been drawn to some statements in the House of Commons as to the alleged decay of the Egyptian obelisk on the Thames Embankment.

"After making a careful personal examination of the monument, my critical eye fails to detect upon its surface a sign of any decay whatever. Were there such, there could be no doubt there would be grains of the stone lying on the altar steps and top of the pedestal. I climbed up and could not see one sign of any decay. I also could see glittering points on the surface, of the solution of silica supplied to me by the skilled chemists of the British Museum, at the suggestion of my old friends, Sir Richard Owen and Dr. Birch, and of which three coats or washes were given with the greatest care, before the trunnions and fastenings for the final lift were placed around it."

However, it has also been stated,¹ probably in reference to a subsequent treatment, that the same monolith "was treated, in 1879, by Mr. Henry Browning, with a solution of gum dammar dissolved in benzin, to which a small amount of beeswax was added, and a very small quantity of corrosive sublimate."

(2). *The Paris Obelisk*.—After its removal from Luxor to Paris, in 1836, this monolith lay untouched for 22 months, while its pedestal was being quarried from a granite outcrop in the western part of France. After its erection, "as a protection against a climate so much more rigorous than that of its native land, the surface of the obelisk was covered with a concentrated solution of caoutchouc."²

¹ Trans. N. Y. Acad. Sci., V (1886), 67, and Gorringe, op. cit., 107.

² Gorringe, idem, 92-93.

It has also been stated that several attempts were made to weatherproof this obelisk with the silica treatment.

As to the present condition of this monolith, Prof. Egleston¹ states: "The obelisk in the Place de la Concorde in Paris is reported cracked all over its surface. Both the European obelisks are therefore in danger of being seriously damaged within the next hundred years."

19. Examination of Obelisk by Committees of Experts.

On November 30, 1889, the Commissioners of the Public Parks of the city of New York requested the following persons to act as a Committee of Experts, to make an examination of the Obelisk and report to the Board, as soon as practicable, as to its condition, with reference particularly to its preservation, viz., Lt.-Col. G. L. Gillespie, of U. S. Engineers, Profs. J. S. Newberry, Albert H. Gallatin, and R. O. Doremus, Mr. E. E. Farnam, former U. S. Consul General in Egypt, and the author. On May 20, 1890, the Committee reported² that they had found the general surface of the Obelisk "in as perfect a state of preservation, apparently, as when it was treated with the paraffin wax compound, over 4 years and 6 months ago," and "in no present need of any additional treatment." They recommended an additional local treatment, by the same process, of certain spots on the monument, which, before 1885, had become more deeply decayed and yet give a hollow sound to a light blow. Of these spots a full individual description was given in an Appendix to the Report, together with a chart of the four faces of the Obelisk, showing their exact location. It was further recommended that the process should be modified for this special purpose, by application of more gentle and longer continued warmth, without the use of the blast-lamp; that no stone should be removed from the surface of the monolith: that a preliminary experiment should be carried on upon a large block of coarse granite, to determine the depth of penetration of the compound into the stone: and that the retreatment of these spots on the Obelisk should take place during the hottest part of the following summer, July or August, when the stone was in its driest state. The recommendation of re-treatment of these spots simply meant that, in view of the deep decay and exfoliation which had occurred up to 1885, the process had been

¹ Loc. cit., 84.

² Report, p. 10.

then carried on too rapidly to insure, in such spots, an infiltration of melted paraffin to a sufficient depth for perfect safety.

On June 30, 1890, the Park Commissioners appointed a Second Committee, consisting of the late Prof. John S. Newberry, (Prof. Albert H. Gallatin, who was unable to serve) and the author, to carry out the proposed experiment and define the details of the modified process. On July 24, this Committee sent in their Report. This and the preceding Report (with the exception of its Appendix and chart) have been printed by the Park Department, but only in small number. It is therefore desirable to present here the principal facts, including the more scientific and technical details.

"The object of the experiment was to determine the best conditions for the re-treatment of the decayed spots upon the Obelisk during the coming month of August. . . . It was necessary in the first place to obtain a large block of granite of approximately the same mineral composition and texture as that of the Obelisk, and, if possible, of the same size." After much exploration of the granite yards of New York City to obtain the use of a block of sufficient size, and many inquiries concerning the granite quarries up the Hudson River, in Connecticut, near Saybrook and along the Sound, and in the islands off the coast of Maine, "our attention was directed to the many large transported boulders of granite or coarse granitoid gneiss which are strewn over the surface of Westchester County. In masses of rock like these, exposed to the weather for ages, we might fairly expect to find the better material for which we were looking—that which had experienced an incipient internal decomposition and increased power of absorption, as in the granite of our ancient Obelisk. Near Tuckahoe and New Rochelle several such boulders were found, though of insufficient size, on the lands of Mr. F. Wiede and of Mr. C. Morgan, to whom also our thanks are due for offered assistance.

At last, near the summit of a hill on Midland Avenue, about two and one-half miles southwest of Bronxville, an enormous boulder, nearly twenty feet in height, of granitoid gneiss, was found on the DeWitt property, which seemed well enough suited for our object. Its mineral components were found to be very nearly the same as those of the Obelisk, viz.: white feldspar (triclinic), potash feldspar, quartz, hornblende, biotite-mica, and a little garnet, magnetite, etc. The volume of the entire boulder was measured and ascertained to be nearly three times that of the Obelisk; but it was divided in two

parts by a deep cleft. Our application to Mr. William D. DeWitt for its use met with his ready consent, and whatever help we needed."

In the ensuing experiment, the Committee had two points in view:—

First, "to determine the rate of penetration of a definite amount of heat into a huge mass of granite, when applied continuously to a small spot on one surface." The practical object was to ascertain the time needed to bring the temperature of a layer of the granite, one to two inches in thickness, up to or a little above the melting-point of paraffin, without injury to the stone.

Secondly, to determine the most effective way, and proper apparatus, for the application of melted paraffin, to cause the deepest penetration and thorough saturation of the warmed stone and of any cavities or crevices lying beneath its surface.

(1). *The application of heat.*—The N.E. corner of the huge boulder was selected for the main experiment, where two vertical faces, approximately even and smooth, met nearly at a right angle. The N. face presented, in cross-section, the edges of the vertical laminæ of the gneiss. The E. face was reserved for the application of the heat, and on the N. face, at a point about 6 feet above the ground, a series of 13 horizontal holes, about 2 cm. in diameter, were drilled at right angles to the face, each to the depth of about 10 inches, for the insertion of a set of thermometers in a sloping line. The direction of these holes was controlled by means of an instrument constructed on the principle of parallel rules; by this also the exact distance was ascertained between the bottom of the hole, where the bulb of the thermometer would lie, and a marked spot on the east face of the boulder, 10 inches south of the corner. The holes were arranged in a line sloping upward at an angle of about 45° , with the purpose that every thermometer-bulb should lie horizontally behind the warmed spot on the east face of the boulder, and yet without the interposition of any other of the bored holes and interference with heat-waves which might thence result. Into these holes the set of long delicate thermometers, with open Centigrade scale, were inserted and firmly packed with soft asbestos-wool or cotton, so that their bulbs were arranged at the following successive distances from the east face, 1.7, 2.4, 2.8, 3.1, 4, 4.8, 5.6, 6.5, 8.3, 24.6, and 50.1 centimeters: and so that the degrees above 20° C. were visible at a glance, upon the projecting parts of the scales, from an observer on a small platform near the corner on the north side.

In front of the east face a shears was erected, supporting the

source of heat, a flat charcoal stove or upright pan, 20 by 14 inches in dimensions, with its face covered by coarse wire-grating, kept filled with charcoal at red heat. This stove was suspended usually at a distance of about 25 inches from the marked spot on the east face. In order to direct and control a uniform heat upon this spot, the stove was partly surrounded by a sheet-iron screen, extending from the stove to the surface of the rock.

The degree of surface temperature was determined by another thermometer, whose bulb lay against the same marked spot. It was controlled by moving the stove occasionally back and forth, when the ignited charcoal varied a little in radiated heat, as on the addition of fresh fuel, so that the temperature should remain at about 88° C. (190° F.); it was found to be under easy control, within a few degrees, with the apparatus described. The experiment began at 11 A. M., on Tuesday, July 20, 1890, in charge of both members of the Committee, and continued for 7½ hours until sunset, the thermometers being constantly observed and noted. The day happened to be very suitable for the experiment, clear and warm, the temperature during the afternoon varying from 25° to 21° C.; the air was nearly calm, with only now and then a very light breeze, which was continuous after 5 P. M. At any time during the experiment, the observer could without discomfort lay his hand on the warmed surface of the rock, alongside of the thermometer. With constant and careful inspection of the surface, during the heating and at its close, "no evidence whatever was seen of cracking, scaling, or any other injury to the warmed stone" on the east face, or on its section on the north face.

(2). *The application of melted paraffin.*—To the spot on the east surface of the boulder, warmed for 4½ hours as just described, melted "paraffin, colored red by alkanet root, was applied with a brush for a few minutes, before the sun went down and brought this experiment to an end. The reddened paraffin was found to have penetrated at least 1.7 centimeters ($\frac{3}{8}$ of an inch), even with so short an application."

"During that experiment, however, another stove was applied in the same way to a neighboring boulder of the same stone, of smaller size, during two hours. To this spot a shallow metal tank was taken quickly and tightly fitted, with its side open against the warmed rock, and filled with the same colored paraffin, kept liquid for one hour longer. The tank was then removed, and, on the next day, the face of the rock was cut off and the depth of penetration

of the paraffin observed on the cross-section. At that part of the face of the rock which had been subjected to the melted paraffin for one hour, it was found that a layer of twenty-five to thirty-two millimeters (one to one and one-quarter inch) had been saturated."¹

To facilitate observation of the depth of penetration, the melted paraffin had been previously dyed to a deep red color by alkanet root. But the curious fact was observed that, although the color was apparently held in true solution, it was strained out of the paraffin by the outer layer of decayed rock, about 3 millimeters in thickness, and only uncolored paraffin penetrated below. As the latter was easily distinguished, this result was of no practical importance. I presume that it may have been due to a precipitation of the color, as a "lake," by the kaolin or free alumina in the weathered crust of the rock.

The Report concluded with the following five recommendations by the Committee:—

"1. That the comparatively slow penetration of paraffin into the solid granite, after so long an application of heat, confirms the view of the shallowness of the present layer so saturated upon the surface of the Obelisk, as accomplished nearly five years ago by the usual quick process. Therefore the experiments of the present Committee lead us to renew the recommendation of local re-treatment, in order to insure the safety of the cracked and more badly decayed spots. The absence of the least indications of injury to the stone, after four hours' continuous warming, seems to us to show that the process can be used without danger. . . .

"2. That the heat should be applied to each spot in the way and with the apparatus already described, at a distance not less than twenty-four inches, in such a way as to keep a thermometer, with its bulb applied to the warmed surface, at a temperature not exceeding one hundred and ninety degrees Fahrenheit, and for a period of about two hours.

"3. That those decayed spots whose small size (three or four inches), indistinct sound on tapping, and freedom from visible cracks, indicate the probable shallowness of the decayed or loosened flake, shall be then, while still continuously warmed by the stove, repeatedly painted over with melted paraffin, by means of a brush or sponge, for about one-half hour to one hour, until the rejection of the paraffin shows their perfect saturation.

¹ Report, 14.

"4. That those decayed spots whose large area (sometimes reaching a diameter of twenty inches), deeper hollow sound, and display of cracks, indicate the depth of their decay and the possible existence beneath of a cleft or cavity of some size, shall be submitted, immediately after two hours' warming, to the action of a tank of melted paraffin for about an hour, or until there is evidence of the arrest of absorption of paraffin.

"For this purpose we also recommend the use of tanks of greater height, in order to increase the hydrostatic pressure of the melted paraffin and its consequent penetration into the interstices of the rock.

"5. We particularly recommend the careful treatment, in the latter method, of the large loosened flakes upon the west face of the pyramidion and vicinity, and of the southwest corner of the Obelisk for thirty feet below, and that the cracks be left neatly filled up or 'pointed' with solid paraffin."

20. *Experiment on rate of penetration of heat into granite.*

For the practical end in view in the experiment described, the rough estimate stated was entirely sufficient. But the figures obtained were available for a closer determination of the rate of penetration of the heat-wave, and this has been since calculated and is now presented below.

Before the experiment, the entire set of thermometers, Nos. 1 to 13, were carefully compared, in the part of the scale used (above 20° C.), in warmed solutions at successively increasing temperatures, with a pair of standard thermometers, made by Tonnelot, of Paris, marked Nos. 50 and 52, kindly loaned to me for the purpose by Dr. Charles F. Chandler. In these, the constants had been already determined at the Yale College Observatory. The comparative trials were carried on in the Laboratory of Microbiology of Columbia College, but need not be described in detail. The results of the comparison yielded the following corrections, which have been applied to all the observations recorded beyond.

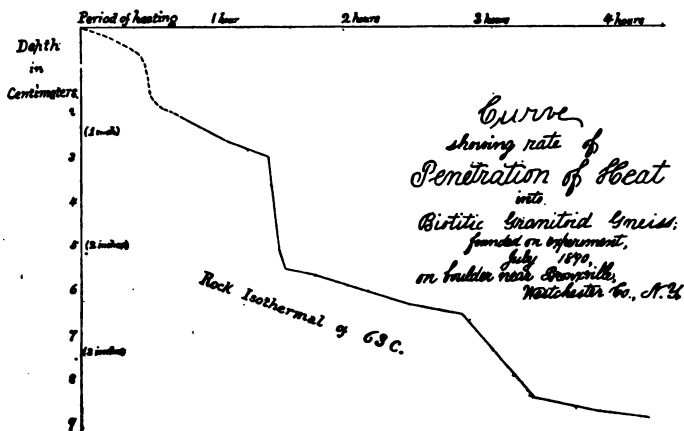
No. of thermometer. }	1	2	3	4	5	6	7	8	9	10	11	12	13
Correction . .	0.	0.	0.	0.	+7	0.	+2	-2	-3	+1	+1	-6	-2

In the following table, the corrected figures are given from the observation note-book:

Time of observation.	Total period of heating (minutes).	Distance of stove from rock (inches).	No. of thermometer.													Distance of bulb from heated surface.	
			1	2	3	4	5	6	7	8	9	10	11	12	13		
			0.	1.7	2.4	2.8	3.1	4.	4.8	5.6	6.5	8.3	8.5	24.6	50.1	Centimeters.	Inches.
11.15 A. M.			25°-2 C.	25.	24.	26.1	24.	24.	24.	24.	22.8	22.6	23.8			Thermometers allowed to assume temperature of rock during three hours. In the second line, the slight increase of temperature, at a depth of 2.8 to 6.5 centimeters (thermometers Nos. 4 to 9), apparently indicates the advance of the heat-wave from the surface recently warmed by the morning sun.	
1.55 P. M.	Stove applied at 2.15 P. M.		24.8	24.3	24.3	24.5	24.7	24.7	24.8	24.7	24.7	24.2	24.4	21.4	20.9		
2.20	5	15	82.														
.21	6	18	88.														
.27	12	25	87.5	45.	36.1	36.5	30.6	32.			25.3	24.4					
.30	15	"		47.	39.6											North side of rock sensibly warm to hand, to depth of No. 3 (1 inch).	
.37	22	"	92.	51.8	44.4	46.	38.3	39.5	31.9		27.2	25.8		21.4	21.2		
.45	30	"	86.5	57.9	50.9	52.8	44.9	42.8	37.6		32.6	28.8	27.7	21.4	21.4		
.46	31	"		60.8													
3.	45	25½	88.	66.1	59.4	60.7	51.6	53.9	47.6	46.5	39.2	35.	33.1				
.20	65	"	85.	73.8	66.7	56.3	58.	59.7	55.3	54.5	45.5	41.3	39.1	21.8	21.6	Stove now refilled with charcoal, in five minutes. North side of rock warm, nearly down to No. 9 (2½ inches).	
.40	85	"	75.5	73.7	68.	67.	60.	60.9	59.2	58.4	48.9	45.3	43.2	22.8	21.8		
.45	90	"							60.4								
.47	92	"	81.8							60.							
4.	105	"	80.4	72.9	72.1	62.9	66.1	64.8	63.9	53.1	50.1	48.1	43.1	23.7	22.4		
.43	148	25	86.4	87.5	80.3	77.5	69.	72.1	73.1	72.1	59.9	57.4	55.3	24.9	22.4	North side of rock warm to depth of 5 inches. Gentle breeze. North side warm to depth of 7 inches. Gentle breeze.	
5.7	172	"	88.5	88.7	82.7	79.3	70.8	74.	76.5	75.3	63.	61.2	59.1	26.9	22.6		
.39	204	"	87.2	89.9	83.8	81.3	71.3	75.2	78.1	77.2	64.6	63.7	61.8	27.	23.4		
6.6	231	"	86.	85.7	81.8	78.7	71.	72.6	78.8	78.1	66.3	65.9	64.	29.6	23.5		
.32	257	"	79.	85.3	80.4	77.7	69.9	72.	77.5	76.9	65.6	65.8	64.2	30.8	22.9		

From these figures I have plotted the curve (Fig. 2), showing rate of penetration of heat into this stone.

Fig. 2.



From a consideration of the figures in the table, and this plotted curve, the following conclusions may be drawn:—

(1). That the progress of the heat-wave into the stone is curiously intermittent, with alternations of slow advances and rapid plunges, lessening however in contrast, in proportion to the increasing depth.

As the stone, though gneissoid in structure, is comparatively homogeneous, and the direction of penetration is normal to the lamination-planes, we may reasonably attribute this character of the curve mainly to the moisture locked up, in varying proportions, in the interstices of the successive layers. The increment of heat seems to be repeatedly absorbed, during a period of one-half to one hour, during the vaporization of moisture in a layer of about one centimeter in depth, and its advance thereby delayed. Then the balance of forces is suddenly broken, possibly by a lateral escape of vapor through some crevice, and a rapid advance of the heat-wave ensues during a few minutes, at first to a depth of two or more centimeters. Then comes the resistance of gathering vapor as before.

(2). The determination of the rate of increment of heat, in this experiment, has been affected by several sources of disturbance and variation. The acquirement of exact and uniform figures would involve the prevalence of the following theoretical conditions: the

emission of heat of definite amount, at a constant rate, from a point, through a homogeneous medium; even thus, the rates of increment, at successive points along a radius of the spherical heat-wave projected through the medium, would evidently decrease, at a rapidly augmenting geometrical ratio with the distances from the center. In our experiment, however, the following sources of variation and disturbance must have accompanied these theoretical conditions:—

(a). Irregular distribution of temperature through the rock, before the experiment.

(b). Irregular source of heat: an indefinitely large number of points, yielding heat in varying amount and intensity. The fuel had to be re-adjusted in the stove, twice during the afternoon, with distinct influence in cooling the surface of the stone; and farther variation must have been produced by the slight breeze which sprang up in the latter part of the afternoon.

(c). Heterogeneous medium: an aggregate of several minerals of different conductivity of heat, chiefly quartz, feldspars, biotite, and hornblende: the occurrence of these minerals in crystals of varying size, lying in all positions, with interstices of irregular size intervening: separation of the aggregate into laminae of varying thickness (mostly 2 to 3 centimeters) and texture, with the biotite-plates mostly arranged in parallelism with the lamination-planes and in part along those planes.

(d). Presence of moisture in the interstices, probably in varying quantity in different layers of the rock, and producing irregular conversion of sensible into latent heat, during the production and the escape of vapor.

(e). Radiation of heat and vapor, both from the heated surface, on the east face of the boulder, and laterally from the north face.

In considering the figures in the table, the influence of these, and probably other conditions of variation, is strongly marked. Taking as a standard the average number of seconds in time required for an increment of one degree of temperature (Centigrade) to a depth of one centimeter, we find great oscillation along any line, either of depth, as marked by a particular thermometer, or of period of time, particularly of the latter. At any depth, within about 8 or 9 centimeters from the surface, the average increment of 1° per cm. varies from 25 to over 50 seconds, say about 36 seconds; while at any periods, passing across the columns of depth, the average increment varies up to more than 100 seconds. At the extreme depths of 25

and 50 centimeters, which also were most affected by lateral radiation and loss of heat through the north face of the boulder, the average increment lessened to a rate of over 2 minutes for 1° of temperature per centimeter of depth.

It would have been interesting to repeat the experiment from the north side of the boulder, on a series of thermometers, with bulbs lying at successive depths along the direction of lamination or strike of the boulder. Our experiment has at least thrown light on some conditions and precautions, which would require attention, in properly carrying on a series of such experiments on the conduction of heat through various species of rock, in directions varying in reference to planes of structure.

The curve presents at a glance the practical result of our experiment, that the temperature of the melting-point of the paraffin-compound (63° C.) reached a depth of 5 to 6 centimeters in about 2 hours.

21. *Absorption-coefficients of Syene granite.*

With a view to determine the exact changes in physical condition in the interior of Syene granite, under the influence of long weathering, both by the conditions of the climate of Egypt and of that of New York, I have made the following experiments, with particular reference to absorptive power. The essential features of my method are founded on a distinction between two modes of absorption of liquid by a porous solid:

(a). *Lateral absorption, i. e.*, from one surface; such as occurs in construction, when ashlar is moistened by rain upon its face. The soaking up of water is here but partial, effected almost entirely by interstices *between* the constituent grains, which may be distinguished as the *rock-pores*:

(b). *Total saturation*, where water is forced into all the interstices of the rock, including the more minute interstices *within* the constituent mineral-grains, which may be distinguished as the *mineral-clefts*. This therefore includes the amount of liquid in the rock-pores, and the difference enables us to estimate the volume of the second class of voids.

All kinds of *mechanical* strain to which a rock may be subjected (such as tension, jar, frost, etc.) are likely to develop mainly an increased volume in the rock-pores; while the irregular contractions and expansions, incident to the combinations, losses, and solutions

which attend *chemical* decay, tend to develop mainly the microscopic clefts in the interior of mineral-grains.

The rock-pores connect in chains of easily communicating voids, forming an intricate network which freely imbibes water, by capillary attraction, from any moistened surface, until completely filled. The communication between the mineral-clefts is interrupted and difficult, and their occupation by liquid is slow, on account partly of their minuteness and partly of their content of air, probably as a condensed film. The distinction of the two classes of voids, of their origin, and of conclusions from their proportion, seems to me important.

The apparatus and process employed for the purpose need to be first described. After some modifications, they were applied by me some years ago to a long series of trials on building-stones of this country, and were found to yield uniform and satisfactory results.

The main apparatus consists of a low bell-jar, 12 inches in diameter and 6 inches in height, with glass knob for convenient handling; this stands in about half an inch of distilled water in a large shallow tray. Within the bell-jar and half immersed in the water, is a round, soft clay tile, with even and smooth upper surface, 9 inches in diameter and about 1 inch in thickness. Before use, this tile must be repeatedly boiled in distilled water to remove all soluble matter from its interstices.

On the top of the tile several pads of sheet-rubber, 3 to 4 inches across, are laid. In the centre of each pad a square opening, 1 inch on a side, is occupied by a pad of thick soft blotting-paper, which, of course, remains constantly saturated with water drawn up from the tile. Each of the rubber pads is also kept covered with a small low glass cover or inverted dish, to prevent the fall of condensed water from the vault of the bell-jar. The water lost by evaporation outside the bell-jar is constantly replaced, so as to keep a constant level. Without a suitable precaution, the raising of the bell-jar from the water would be accompanied by a sudden inrush of water and flooding of the tile. This is prevented, either by a short bent piece of glass tubing, which passes from outside down and around the edge of the bell-glass and so up into its interior, so as to provide constant communication between the air outside and in; or more conveniently by a half-inch hole bored through the vault of

the bell-glass, closed by a cork, which is removed every time, before the bell-glass is raised.

The stone to be examined is either cut into a dressed cube of an inch on a side, or broken into a fragment of about that form and size; with either, the result seems to be the same. A sawn cube is always previously digested in ether or chloroform to remove any oil or grease possibly adhering or absorbed during the sawing or handling. All cubes are first dried in a desiccator, over sulphuric acid. Before every weighing, the cube is wrapped tightly in a doubled sheet of tin-foil of known weight.

The process consists of the following steps: The cube, on removal from the desiccator, is weighed in its tin wrapper, pressed down into firm contact upon the yielding wet pad of blotting-paper, covered, and there left under the bell-jar until filled by lateral absorption. This usually requires 2 or 3 hours, and is often indicated by little drops of water exuding upon the upper surface. The cube is then quickly pressed surface-dry in a piece of filter-paper, instantly wrapped in the tin-foil and weighed. This is repeated to insure constant weight. The cube is then immersed in non-aërated distilled water and put in the vacuum of an air-pump until effervescence ceases, again wiped surface-dry, and weighed in its tin wrapper; this is repeated to constant weight. Finally the cube is weighed in distilled water at determined temperature.

Four specimens were examined in this way, viz.:—

A. Granite from the ancient quarry at Syene, selected from a large number of specimens, on account of its fresh appearance.

B. Granite from the Syene quarry, apparently showing slight decomposition, by dulled color and lustre, and by some fine cracks.

C. Fresh granite of the Obelisk, obtained in January, 1881, soon after the erection of the Obelisk, and probably derived from chip-pings off the heel of the shaft, done under direction of Commander Gorringe.

D. Flake of disintegrated granite, removed from surface of the Obelisk in 1885, supplied by the Park Commissioners.

The trial of these paired specimens yielded the following results:

The actual weights obtained, in grams, are given in the table beyond.

	Specimens tested.	Dried cube.	Cube moistened by lateral absorption.	Cube saturated by immersion.	Cube in distilled water at 25° C.
A	Fresh granite, Syene quarry	28.539	28.586	28.595	17.770
B	Decayed granite, Syene quarry	68.183	68.365	68.436	42.755
C	Fresh granite, Obelisk in 1881	82.415	82.483	82.640	51.193
D	Decayed granite, Obelisk in 1885	32.735	32.792	32.886	20.513

From these weights the following coefficients have been calculated; *a* and *b*, in percentage of weight of the rock: *c*, *d*, and *e*, in percentage of its volume: and *f* and *g*, in percentage of its Total Voids.

Determinations of Absorption of Syene Granite, fresh and decayed.

Specimens tested.	<i>a.</i>	<i>b.</i>	<i>c.</i>	<i>d.</i>	<i>e.</i>	<i>f.</i>	<i>g.</i>	<i>h.</i>		<i>i.</i>
	Coefficient of lateral absorption.	Saturation coefficient.	Rock voids (pores).	Mineral voids (clefts).	Total voids.	Rock pores.	Mineral clefts.	Mineral matter.	Specific gravity.	Entire rock and interstices.
A	.165	.196	.434	.083	.517	84	16	2.650		2.636
B	.267	.371	.709	.276	.985	72	28	2.681		2.655
C	.083	.273	.216	.500	.716	30	70	2.640		2.621
D	.174	.461	.461	.759	1.220	37	63	2.678		2.646

I have long hoped to confirm and develop these results, by similar experiments on a more extended series of specimens of granite from Syene, for which I have been waiting. These were to include, especially, specimens of fresh rock, to be reached by blasting from some depth below the present surface in the quarries. On these, chemical analyses were also to be made. But the recent death, in the midst of his own useful investigations, of the friend, Mr. F. Cope Whitehouse, on whose offered assistance I relied to procure this material from Egypt, has decided me to publish at once the results so far obtained.

22. *The causes and progress of the decay of the Obelisk.*

From the foregoing figures the following conclusions, I think, may be safely drawn, even from this limited series; though we

must allow for differences in constitution of the rock, in considering such small quantities, and for unknown variations in the length of exposure of these specimens to the weather.

(1). This granite, from whatever source derived, is by no means a compact mass, but is traversed by interstices in notable proportion, amounting to (see column *e* on *total voids*) from one-half to over one per cent. of its volume, according to its fresh character or condition of incipient decay.

In other words, even the dense Syene granite is finely spongy throughout, in its freshest state.

(2). In regard to the rock aggregate, the fresh granite (*c*) from the Obelisk, probably broken from the ever sheltered heel of its shaft, apparently represents either accidentally the most compact variety, or else the freshest condition of the Syene granite in my series, retaining the lowest coefficient of lateral absorption (.083), *i. e.*, the smallest proportion of rock-pores, about $\frac{1}{8}$ of one per cent. of the volume (.216). But in regard to the constituent minerals, the fresh granite, as just arrived from Alexandria, contained nearly 50 per cent. more voids (716 to 517) than that at Syene, chiefly in its more abundant mineral interstices. This may indicate the efficiency of hydration in the damper climate of the Egyptian sea-coast.

(3). The progress of decay of the surface chips of the granite, in the quarry at Syene, was attended with increase in the minute interstices of its component minerals rather than in the pores of the rock; the original relationship (columns *g* and *f*) 16 to 84 became 28 to 72.

This seems to show that, in the arid climate of Syene, the chief element of decay in the granite was chemical, consisting in the absorption of oxygen and water by its minerals. The limited absorption of the latter, however, is shown by the determination of the loss by incineration at 0.65 per cent., and in the microclin at 0.35 per cent.¹

(4). The progress of decay in the granite of the Obelisk, on the other hand, from 1881 to 1885, has yielded an increased proportion of rock-pores; the relationship of 70 to 30 having changed to 63 to 37. The mineral voids have increased 50 per cent. (.500 to .759), and the rock-voids have more than doubled (.216 to .461).

This indicates the action of a chemical force on the minerals, increasing their clefts, and a still more efficient mechanical action;

¹ Delesse, *loc. cit.*, 489.

the latter, between the arrival of the Obelisk at New York and the autumn of 1885, had produced a widening of the pores in the surface of the rock and incipient disintegration. This seems to me to prove that the active absorption of water, in our rainy seasons, by the minerals on the surface of the Obelisk, was the first and a continuous cause of decay. But there was, as plainly, a rending force, apparently greater than that which can be attributed to expansion by hydration.

(5). One result of decay, both in the granite of the quarry at Syene and in that of the Obelisk during its $4\frac{2}{3}$ years exposure in New York, consists in an increase of specific gravity, both in the mineral matter and in the entire rock with all its interstices. This is a further indication that the actual expansion by hydration, in the decayed surface, just referred to above, must have been very small, and that the rending force must be sought in some other direction.

The specific gravity of the granite of our Obelisk was determined by Persifor Frazer in mass, including its cavities, at 2.6618; when determined in grains of the size of a pea, at 2.7188; giving the weight of one cubic foot of the rock at 166.1625 pounds avoirdupois. According to G. W. Wigner, the specific gravity of the stone of the London Obelisk was 2.682; absorbent power of the fresh stone, at the rate of 5.4406 grams of water per square meter, and of the weathered surface at a rate six times as great.

There are only two other forces, to whose sudden application or increased action the rapid exfoliation of the surface of the Obelisk from 1881 to 1885 has ever been attributed.

One of these is our climatic variation in temperature, with frequent sudden changes within a single day, enhanced by the strong heat of the sun. But I have already shown, from the even wider ranges of temperature in the climate of Egypt, at a higher portion of the scale, and from the observed results upon the sun-exposed faces of all obelisks, that this supposed cause had little or nothing to do with the surprisingly sudden disintegration which attacked the Obelisk immediately after its arrival.

It seems therefore established that we must attribute those visible effects of decay entirely to the violent force which was then exerted upon the monolith, almost for the first time in all its history—that of frost. The power exerted by the expansion of water in freez-

ing, within the pores of a stone, is so well known, that it needs no discussion here.

It is therefore evident that, for the protection of the Obelisk from this fierce attack, it was only necessary to insure the complete exclusion of moisture.

Any process, however, in which waterproofing material is applied in solution, even to a theoretically dry stone, must be imperfect *per se*. On the evaporation of the solvent, which constitutes the chief volume of the solution, the outer pores of the stone, empty to a slight depth, are in large part simply lined instead of filled with the protective residue. Nor can this deficiency be supplied by further applications of the solution, in successive coats: for already many of the pores have been sealed to further permeation, and the result must be a merely superficial cellular coat. On the other hand, practically, in any large solid mass of stone or masonry exposed to the weather in our climate, the pores are already occupied, and permanently, almost to the surface, by water, even in the hottest and driest weather. This forbids the satisfactory penetration of a waterproofing solution to any material depth.

The process theoretically called for by the decaying Obelisk, in 1885, was one by which the pores of the granite should be first emptied of moisture to the depth of at least two inches, by some gently applied but long continued absorbent, such as dry air or gentle heat: and by which, secondly, the empty pores should be completely saturated to that depth with a liquid preservative, of melting-point above the mean temperature of the stone, strongly adherent, permanent under weathering, and solidifying with slightest possible contraction. These conditions were, I think, fortunately approached by the process then applied, and will be still more closely approximated by the modified process, recommended by the two Committees, for the special retreatment of the decayed spots upon the Obelisk.

As an additional means of protection to the injured surface, I have elsewhere¹ suggested the propriety of restoring the ancient gilded cap to the apex of the pyramidion, regilding the remainder of the surface of the pyramidion below the cap, and regilding the hieroglyphic intaglios on the four vertical faces of the Obelisk. Aside from the appropriateness of this restoration from the archæo-

¹ The Misfortunes of an Obelisk, 128.

logical point of view, already fully discussed in the paper referred to, such an impervious metal film would serve as an efficient covering, to shed rain-water, sleet, and melting snow from the sloping sides of the pyramidion and from the hollows of the deep intaglios which cover the shaft below. To these hieroglyphs the Obelisk owes its chief interest as a historical monument, and, unfortunately, their cavities and projections, although still preserved, have suffered the chief injury by the surface-decay. The regilding could be carried out at small expense, and would be a most useful ally to the waterproofing treatment. Nothing too much can be done by our City authorities to secure both the preservation and proper decoration of this unique Symbol of the Sun on American soil, and to offset the deplorable neglect of our City, up to 1885, in its care of this magnificent gift from a generous citizen, the late Mr. William H. Vanderbilt.

Finally, then, when we return to our rusty pebble and the Egyptian boulder, what conclusions may we fairly draw as to the conditions attending their decay?

A. The main agency, by far predominant over all others, in the decay of these granite masses, has been aerated rain-water; this has been aided in Egypt by extreme and constant oscillations of temperature. Their means of action have been two-fold.

(1). *Chemical*, by absorption of water, together with oxygen, in combination with part of the bases of the unlocked silicates, and gradual removal of the rest in solution, producing irregular changes of volume and proportionate increase of the mineral-clefts.

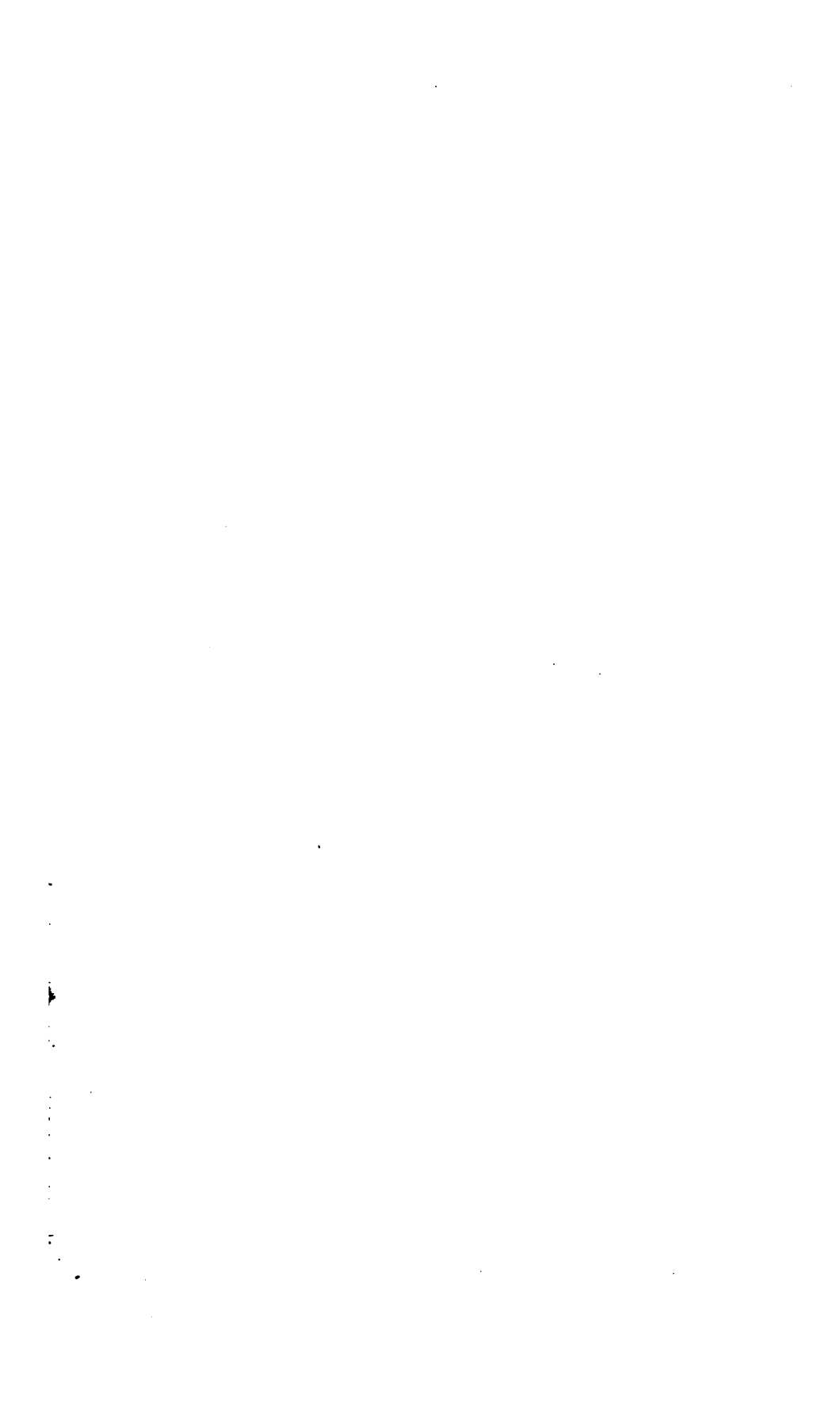
(2). *Mechanical*, through expansion by the sun's heat and contraction by night-radiation, aided by artificial roasting in some cases, tension and jar during transportation, further washing out of soluble matters, and, in our climate, freezing: all producing increase of the rock-pores.

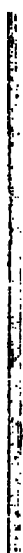
B. The rate of action of each process is approximately indicated by some of the facts stated:—

(1). Chemical action with a limited rainfall, efficiently aided by oscillations of temperature, has tended, in the hot and comparatively arid climate of Syene, to cause the disintegration and removal of a layer, at least one centimeter in thickness, from the surface of the granite-cliffs at Syene, during a period of five to six thousand years. Forty-five centuries have been generally insufficient to produce any visible external injury and exfoliation.

(2). Mechanical action, predominantly that of frost, has worked in the climate of New York at a vastly more rapid rate. On the surface of the Obelisk, already scarred and weakened by fire, it completely loosened a shell of about 0.73 mm. in thickness in $4\frac{3}{4}$ years, equivalent to 1 centimeter in 70 years—or more nearly 1 centimeter in 50 years, when we allow for the decayed and partially loosened material which has not been removed from the surface of the monument. But although this rate far exceeds that of the estimate of Dr. Barnard (1 cm. in 6000 years) there is no evidence that it must be continuous; the chief exfoliation has been probably already effected in the weakened, thin outer layer of stone; the main stone below is practically sound.

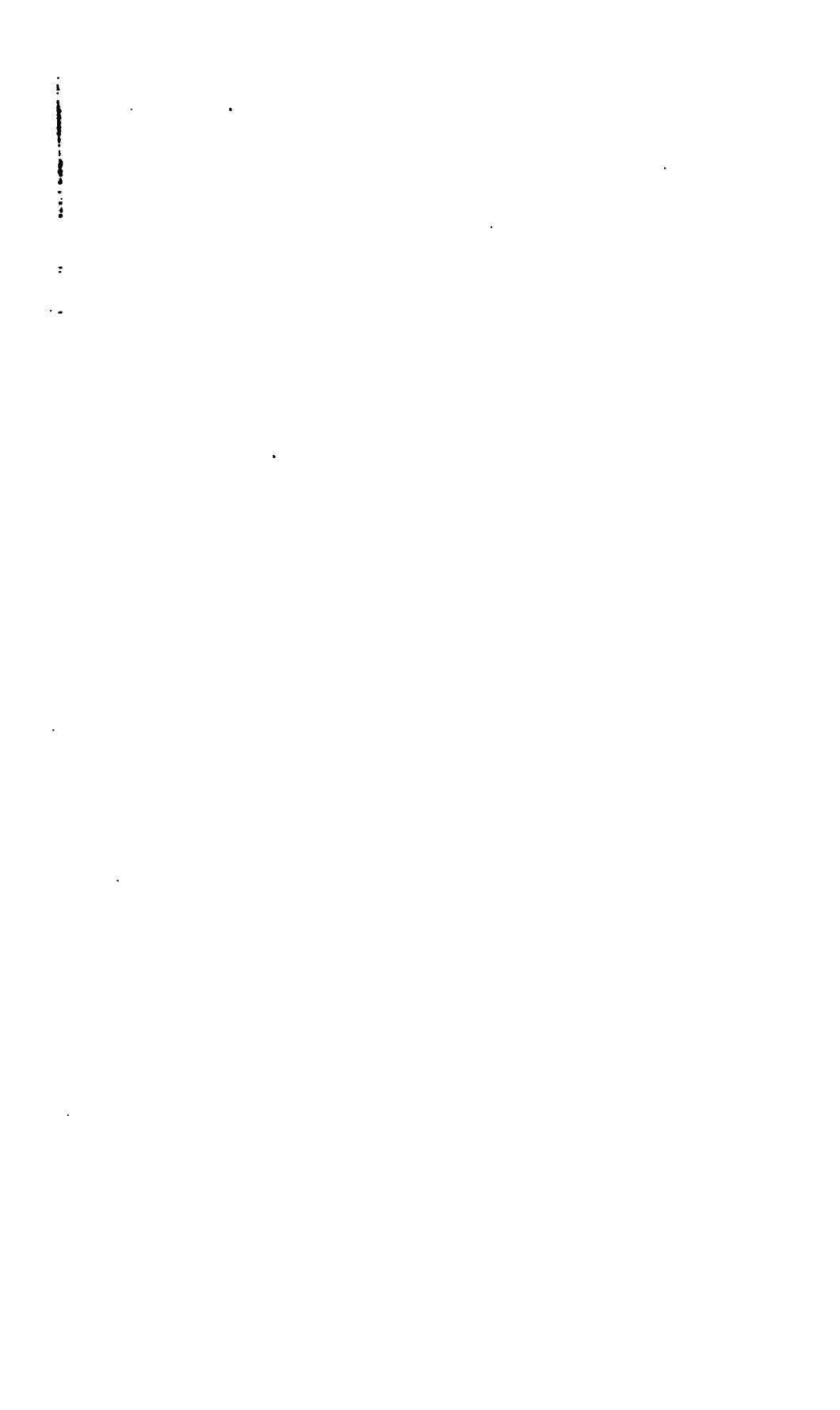
It appears then that an ancient column of granite like this, while unfitted to mark the flying hours on a Roman dial, may yet serve us as a true gnomon to record some phases of rock-decay at intervals in geological time.











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